THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. X. Nº 226—13th YEAR.] LONDON, JUNE 18, 1861. [Subscription per Ann. { 15s. in Advance / 18s Credit.] DOUBLE No. Price 1s.

CANNEL COAL.

RAMSAY'S NEWCASTLE CANNEL has become the principal Cannel Coal used in the Metropolis. Its joint products of gas of high illuminating power, and coke of good quality, make it one of the most economical coals known. The Crystal Palace was lighted from it in 1851, and the Post-office, and *Times* Office, are at present.

FIRE-CLAY RETORTS and PIPES.

FIRE-BRICKS (marked "RAMSAY") OF ALL DESCRIPTIONS.

G. H. RAMSAY, Broad-chare, New-castle-on-Tyne.
Manufactory established in 1801.

APPOINTMENT OF AN INSPECTOR OF GAS-METERS.

CITY of MANCHESTER.—The Justices of the Peace for the City of Manchester, having determined to proceed with the appointment of an INSPECTOR under the provisions of the Act 22 and 23 Vict., cap. 63, entitled "An Act for Regulating Measures used in the Sales of Gas," are now prepared to receive applications for the office.

The person appointed must have a practical acquaintance with Gas and Meters, or otherwise such general and scientific knowledge as will enable him speedily to obtain a practical knowledge of his business.

He will be required to devote his whole time to the duties of the office, and to enter into security to the amount of £300 for the due and faithful performance thereof.

The Salary will be £200 per annum.

Applications for the appointment, accompanied by Testimonials of character and ability, to be sent, post free, to the undersigned on or before Saturday, the 22nd day of June instant.

THOS. HIGSON,
Clerk to the City Justices.
City Police Court, Manchester, June 7, 1861.

TO PIPE-LAYERS, &c.

TO BE LET, the Excavating, LAYING, and COMPLETION, of about a Mile of 24-inch and 21-inch MAIN GAS-PIPES.

The Specification may be seen on application at the Offices of the Sunderland Gas Company, 61, Fawcett Street, SUNDERLAND.

Tenders will be received until Six o'clock on Tuesday Evening, the 25th inst. JOHN H. COX, Sec.
Sunderland, June 14, 1861.

COUNTY and General Gas Consumers COMPANY (LIMITED).—Works at Chertsey, Lea Bridge, Northfleet, Pembroke, Pembroke Dock, Ware, and Walton-on-Thames, producing a gas rental of about £6500 per annum.

Established for the erection of gas-works in provincial towns, or the purchase or leasing of existing works on equitable terms. Application to be made to the Engineer to the Company, Mr. H. P. STEPHENSON, 58, PALL MALL.

COWEN'S PATENT FIRE-CLAY RETORTS

JOSEPH COWEN and CO.,
BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE CLAY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their Works as above.

COWEN'S GARESFIELD COAL AND COKE.
Coal and Coke Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.

JOHN RUSSELL AND CO.,
THE OLD TUBE WORKS,
CHURCH HILL, WEDNESBURY;
ALMA WORKS,
WALSALL, STAFFORDSHIRE;
and 69, UPPER THAMES STREET, LONDON,

Original Manufacturers of Wrought-Iron Gas Tubes and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.

Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.

N.B. All Goods thoroughly Tested before sent out, and Warranted.

TO GAS COMPANIES AND CONTRACTORS.

FOR Sale, several lengths of Hydraulic MAIN, 14 inches diameter and 6 feet 9 inches long, with 7 holes for DIP-PIPES.

Also 4-inch ASCENSION-PIPES, and 3-inch ARCH and DIP-PIPES, and RETORT MOUTHPIECES, all in excellent condition, and will be sold at a very low price, and delivered, if required, at any Railway Station in London.

To be seen, on application to the ENGINEER, at the Equitable Gas Company's Works, Lupus Street, PIMLICO.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS, NEAR NEWCASTLE-ON-TYNE.

WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

London Agents:
JAMES LAWRIE & CO.,
63, OLD BROAD STREET, CITY, LONDON.

TO GAS-RETORT MAKERS AND OTHERS.

THE Managers of the SOUTH METROPOLITAN SCHOOLS at Sutton, Surrey, are desirous of receiving Tenders for the supply of 3 NEW RETORTS, and Setting the Same, and for a General Repair of the Works in their Gas-house at Sutton.

Also, Tenders for the performance of such work as may be necessary to keep the Retorts, and other works connected with the supply of gas, in proper order, at per annum, for three years, from the 24th day of July next.

Tenders detailing the work proposed to be done, sealed up, and addressed to the Managers of the Schools, are to be sent to me on or before the 16th of July, in order that the Managers may consider them on Tuesday, the 17th of July, at Two o'clock, p.m., at SUTTON, when Contractors are at liberty to attend.

The Managers do not bind themselves to accept the lowest or any Tender.

By Order, JOSEPH BURGESS,
Clerk to the Manager,
June 17, 1861. Walworth, S.

WANTED, by the Advertiser, a Situation as MANAGER of a Country Gas-Work. Is thoroughly qualified for the situation by long practical experience.

References and Testimonials as to character and abilities.

Address P. O., Office of JOURNAL OF GAS LIGHTING, 11, Bolt Court, Fleet Street, LONDON, E.C.

Price 2s. 6d.

In the press, and shortly will be published. Addressed to Gas Consumers, Shareholders in Gas Companies, and Local Authorities throughout the Kingdom.

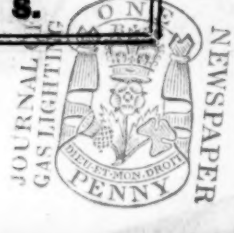
GAS LEGISLATION, with a Copious Index, and Commentary on the Metropolis Gas Act, 1860.

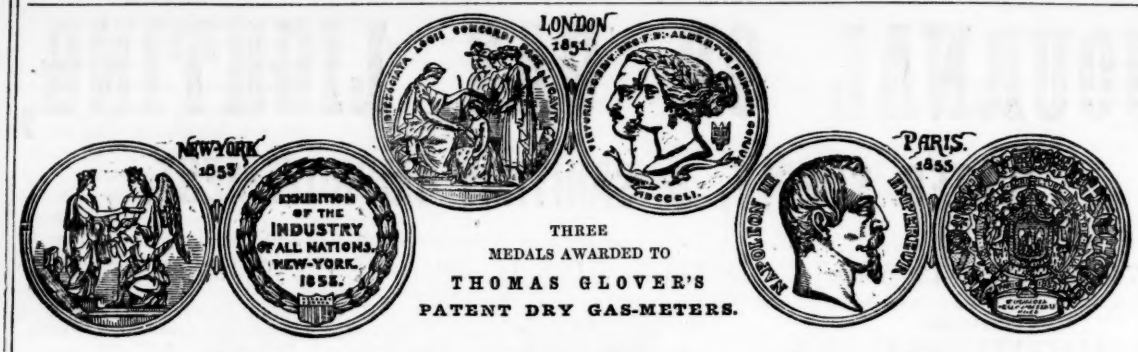
By SAMUEL HUGHES, C.E., F.G.S.
London: WATERLOW and SONS, Parliament Street.

WOLVERHAMPTON RETORT WORKS.
ESTABLISHED 1840.

JOHN EUNSON & SON,
Gas Engineers, and Manufacturers of Clay Retorts
AND FIRE GOODS IN GENERAL,
WOLVERHAMPTON.
Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

THE IMPERIAL IRON TUBE COMPANY,
(SUCCESSORS TO GEORGE B. LLOYD & CO.,)
GAS STREET AND BERKLEY STREET,
BIRMINGHAM,
Manufacturers of Wrought-Iron Tubes and Fittings,
FOR GAS, STEAM, AND WATER.
PATENT GLASS ENAMELLED AND GALVANIZED TUBES,
AND
LAP-WELDED IRON BOILER TUBES.





THREE
MEDALS AWARDED TO
THOMAS GLOVER'S
PATENT DRY GAS-METERS.

LORD REDESDALE'S "SALE OF GAS ACT."

DRY METERS *VERSUS* WET METERS.

LONDON, February 25, 1861.

THOMAS GLOVER begs to call the attention of Gas Companies and others to a few *facts*, which, if duly considered, must lead to most important conclusions :—

1. That since THOMAS GLOVER commenced to manufacture his Patent Dry Gas-Meters (which is now upwards of 15 years), every Wet Meter Maker of any importance in England has been compelled to manufacture Dry Gas-Meters; and in the JOURNAL OF GAS LIGHTING, of date of 12th of February, 1861, Messrs. William Parkinson and Co., successors to the late Samuel Crossley, advertise that they "intend manufacturing *Dry* as well as" Wet Meters, and it is worthy of particular notice that they intend to do so "after 40 years experience in manufacturing Wet Gas-Meters of such a quality that has enabled them, as they say, to maintain a superiority over all other; and this, be it also particularly noticed, after they had advertised in the JOURNAL OF GAS LIGHTING, January 29, 1861, "their improved low-spouted Gas-Meter with new patent float arrangement, which entirely overcomes the difficulty experienced by ordinary Wet Meter."

2. That it is quite consistent with THOMAS GLOVER'S knowledge that Wet Gas-Meters, called "low-spouted" or "compensating Wet Meters," have already been proved to be incapable of continuous working or registration, and for this reason the manufacturers of these Meters have been induced to seek the repeal of Lord Redesdale's (righteous) Sale of Gas Act.

3. That every year the Patent Dry Gas-Meter manufactured by THOMAS GLOVER has risen in favour with Gas Companies and Gas Consumers, placing him in the proud position of being the largest manufacturer of Gas-Meters in the country.

THOMAS GLOVER guarantees his Patent Dry Gas-Meters to meet all the requirements of the "Sale of Gas Act," to give accurate and unvarying registration with steady lights; and, from their peculiar construction, cannot be tampered with, and may be fixed in open situations even above or below the level of the lights. They work with less pressure than Wet Meters, and are not affected by the most severe frost.

THOMAS GLOVER guarantees to uphold all Meters sold by him for 5 years free of expense to the purchaser, or for a trifling per centage per annum will contract with any Gas Company to uphold their Meters of his manufacture for a series of years; and, at the conclusion of such contract, to lease the Meters all in perfect working order.

N. B.—Agents in several parts of England are wanted. Apply by letter, or personally.

WILLIAM PARKINSON AND CO.

(SUCCESSORS TO SAMUEL CROSLEY),

PATENT WET AND DRY GAS-METER MANUFACTURERS, &c.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

PATENT IMPROVED WET METER.

W. P. and Co. invite especial attention to this Meter, which entirely overcomes the difficulty to which ordinary Wet Meters are subjected, owing to the short range of the Float, which is necessary, in order to meet the requirements of the Sale of Gas Act.

"It is well known that in Meters constructed so that the valve will close when the water is drawn off to such a point as to render them 3 per cent. slow the lights are liable to be extinguished by the closing of the valve by a sudden increase of pressure. To meet this difficulty, Mr. Pinchbeck has invented an ingenious and simple arrangement by which the action is reversed, and any such increase of pressure, in his Meter, raises the value instead of depressing it. The fact of the improvement having been adopted by Messrs. W. Parkinson and Co. is a sufficient guarantee that it practically and effectually remedies the inconvenience it is designed to meet."—JOURNAL OF GAS LIGHTING.

IMPROVED DRY METER,

Which W. P. and Co. pledge themselves to manufacture with the same quality of materials and workmanship as in their Wet Meter, thereby giving Gas Companies and others the advantage of procuring a first-rate Dry as well as a Wet Meter, which, hitherto, they have been unable to do.

STATION-METERS AND GOVERNORS,

Which can be seen at all the London Gas-Works. Also Liverpool, Manchester, Sheffield, Nottingham, Belfast, Glasgow, Birmingham, Dublin, Bristol, Leeds, Leicester, Brighton, Southampton, Sunderland, Wolverhampton, Bradford, Norwich, &c., &c.

TEST GASHOLDERS, EXPERIMENTAL METERS, EXHAUSTER REGULATORS,

MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

CONTENTS.

	PAGE
Leading Articles:—	
Notes upon Passing Events	419
Circular to Gas Companies	422
Register of New Patents:—	
Bowditch, W. R.—Improvements in the Purification of Gas	424
Wanostrocht, V.—Improvement in the Manufacture of Mineral Tar	425
Keen, R. E.—Improvements in Cocks, Taps, and Valves	425
Robb, J.—Improvements in Gas-Stoves	425
Application for Letters Patent	425
Grants of Provisional Protection	426
Notices to Proceed	426
Parliamentary Intelligence:—	
Progress of Bills in House of Lords	426
Progress of Bills in House of Commons	426
House of Lords Committees—	
Sowerby Bridge Gas Bill	427
Elland Gas Bill	427
House of Commons Committee—	
Stockport District Water-Works Bill	433
Legal Intelligence:—	
Vice-Chancellor's Court.—Clark *v.* the Corporation of Hastings	442
Court of Queen's Bench.—Prior *v.* Laming	443
Court of Common Pleas.—Holliday *v.* the Vestry of St. Leonard, Shoreditch	446
Miscellaneous News:—	
Metropolitan Board of Works	447
On the Colouring Matters derived from Coal-Tar	447
Dr. Letheby's Report on the Gas Supplied by the Great Central Company	449
Dr. J. Northcote Vinen's Fortnightly Report on the Gas Supplied by the Surrey Consumers Company	449
Explosion at an American Oil-Well	449
Conviction for Illegally Obtaining Gas	449
The Gas Supply of Brighton	449

TO CORRESPONDENTS.

W. D.—*The theoretical results are correctly stated in your letter of the 23rd ulto., but the effective delivery may be modified by bends or angles formed in the line of main, or by irregularities in the interior surface of the pipes. The formula presumes the pipe to be straight as well as level.*

A. W.—*Mr. Penfold's is the only work published on the assessment of gas and water-works, but the law on the subject is clearly laid down in Archbold's Poor Law, 10th edition, from page* 166 *to* 172.

R. P.—*Turned and bored pipes have never, to our knowledge, been used for conveying water, except under peculiar circumstances—such, for instance, as in the bed of a river.*

NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

The next number will be published on Tuesday, July 2, and the subsequent numbers on each successive alternate Tuesday.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

This JOURNAL has been duly registered at the General Post Office for transmission abroad.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JUNE 18, 1861.

NOTES UPON PASSING EVENTS.

We give, in another place, a report of the judgment in the Common Pleas, in the case of *Holliday v. the Vestry of St. Leonard's, Shoreditch*. This judgment deserves serious attention at a time when the public works of municipal and parochial bodies are becoming numerous and important. Lord Chief Justice Erle has decided that a body or corporation performing public duties *gratuitously* is not responsible for injuries inflicted on private individuals, through the misconduct or default of persons engaged by them to do public work. In the case in question, the workmen employed by the vestry's surveyor, left a heap of stones in a street under repair, at night, without light or watchman to warn the drivers of vehicles, and the plaintiff, riding along in a cart, was upset and injured. If the parties who directly or indirectly caused this accident had been a gas, water, or railway corporation, or private individuals, there would have been no question about their liability. Chief Justice Erle also stated that, where a municipal corporation, although acting gratuitously, made a profit by its works (for gas, or water, or docks), they would be liable; but, where no profit was made or trade is carried on, those parties "acting gratuitously as a public body, are not responsible" for damage done through the negligence of their agents. There can, therefore, in future, be no doubt about the law, however grave may be the doubts as to the justice of the law. Very recently, public opinion has compelled a change in the law which denied costs to suitors successful in defending suits brought against them by the crown. Surely, an alteration of the law which renders municipal bodies irresponsible for the grossest negligence, is not less required. Without such an alteration, the principle laid down by Blackstone—that there can be no wrong without a remedy—would be falsified.

Dr. Letheby is a very fortunate man—more fortunate than several of the most eminent scientific men of the day—more fortunate than several learned and laborious persons who devote their whole time to the service of the public in such institutions as the British Museum. The corporation of London has recently raised Dr. Letheby's salary, as medical officer of health, from £400 to £600 a year. Handsome payment for drawing up a dozen reports, the materials for which are easily collected from the engineer and the inspectors of nuisances, and the preparation of which does not divert the doctor's attention from the lucrative private business which he carries on as analytical chemist and scientific witness. There can be no question but that Dr. Letheby has exercised a very useful influence in the City of London, by putting in plainer language than even common council men could understand, the economy of cleanliness. But, if any more money is to be expended in the sanitary cause, it would be best laid out in the department that does the work as well as report. Mr. Elliott was not far wrong when he said that an assistant engineer would be of more use than a medical officer—always excepting the value of a popular professor like Dr. Letheby—to teach aldermen and their deputies the pecuniary value of a well-cleansed city.

There is a talk of re-electing Lord Mayor Cubitt for the International Exhibition year of 1862. Knowing the high position that the "*Lor-Maire*" holds in continental opinion, it is not surprising that the citizens of London should desire to retain the services of a gentleman who has solid practical claims to his official position beyond his wealth. The Lord Mayor Cubitt is one of the two or three aldermen of the City of London who understand something beyond buying cheap and selling dear. He has the knowledge and discretion which will enable him to acquit himself creditably before the representatives of the continental nations likely to be brought to city dinners by the exhibition of next year. The commissioners of this exhibition have overcome the building difficulties raised by Mr. Surveyor Donaldson, and will be permitted to erect, without hindrance, an edifice unequalled for vastness and ugliness, and will, no doubt, be able to fill it with pretty, amusing, and saleable specimens of manufactures, and certainly with the finest collection of works of art, of the 18th and 19th centuries, that has ever been brought together in one place.

The new gardens of the Horticultural Society will form a more agreeable external addition to the internal attractions of Messrs. Kelk and Lucas's great building. At the present time, there is a little reaction going on against the indiscriminate praise of official paragraphs. People with a recollection of the annually-increasing glories of the Sydenham Gardens, or after the contrast afforded by the adjoining Kensington Gardens—where, by the bye, such an agreeable improvement has been made by the joint efforts of Mr. Hawksley, the engineer and architect, and Mr. Thomas, the sculptor—complain that the last speculation of the Horticultural Society is small and flat, and even compare it profanely to a cemetery walled in with catacombs. The flatness was an inevitable accompaniment of the situation, which constitutes the advantage and the attraction of the undertaking. The Crystal Palace had proved that the cream of fashion, or even the minor stars who disport in gorgeous attire, would not go far to see the most beautiful garden scenery in Europe; even Chiswick was a failure, and could not stand its ground against the Exhibitions of the Regent's Park Society. The complaints, as to the limited extent, are nearly in the same category. The suscribers have got all, and more than could

have been expected, for the money they paid; and when forty guinea Fellows (chiefly in crinoline) complain that their garden will be in effect only the back garden of a terrace of palaces, now building, they forget that it is only the price of this building land that enables them to have this triumph of Mr. Nesfield's gardening art at all. The Horticultural Society did not buy; they only leased twenty-two acres at a nominal rent. But, when we have said this, we have said nearly all. We do admire the arcades, which are so well suited to our variable climate; but we cannot be made to prefer the Horticultural, with its formal beds of red brick-dust and yellow ochre colour, and its lines of ugly Lombardy poplars, to Kensington or Sydenham Gardens because it is called a terrace garden. We accept it as an agreeable addition to the luxuries of London, without believing that this time Nesfield has excelled Paxton.

It seems that the commissioners of the 1862 Exhibition have not decided whether or not to award prizes for excellence in manufactures. If they do follow the examples of Hyde Park in 1851, and Paris in 1855, they will make a blunder which will be very injurious to the undertaking. As a general rule, the distribution of prizes for manufactured goods is a lottery, in which chance is tempered by corruption. In a few very rare instances, a prize has made public, if not stimulated, a valuable invention; but, in ninety-nine cases out of a hundred, a prize awarded is either surplusage or a mistake; for there is no satisfactory way of discovering the relative merit of manufactured goods or of machinery. The prize won by a racehorse shows that he is the swiftest in that race on that day; and, yet the trial, the simplest and easiest of all competitive trials, is considered on the turf to prove very little until it has been repeated a number of times. It requires the trials of one or more seasons to make the reputation of a racehorse. The prizes given for breeding stock are a stimulus to exertion amongst a wealthy class, to whom pecuniary profits are a secondary consideration, and to the wealthier grazier class, to whom they afford an advertisement, which could in no other way be provided. Yet, in the present stage of agricultural enterprise, and with the present facilities for agricultural publicity, it is a question whether, as far as improvement of breeds is concerned, they do not do as much harm as good. The great value of the prize system in live stock shows, is in the means it affords of educating the eyes of the agricultural public to an appreciation of correct models of symmetry. Prizes to students are intended to bring the ablest to the front, and to inoculate all the competitors with a certain amount of knowledge, and love of study. But the real prize of a manufacturer is trade success, as proved by customers who approve of, and purchase goods made at a profitable price. For whose benefit are prizes given to a manufacturer to reward him for selling something by which he makes a profit? Clearly not for the manufacturer's benefit; he is not a student who has devoted his life to laborious, important, yet pecuniarily unprofitable studies, like Professors Airey, or Owen, or Max Muller. He has gone in for a profit; and, if he has produced what the public want, he will be repaid; and, if he has not, a medal will not pay him. Then, it must be for the benefit of the public. It must be to teach the innocent public what to buy, "what to eat, drink, and avoid," for instance. But, in order to do this with any advantage, we must be quite sure that we have better means than the public of ascertaining the comparative value and merit of the articles exhibited. Unless the tribunal which decides on the medal value of Mr. Mechi's razors, for instance, is more competent than the people who shave with them, the decision is a farce. Thus, in the outset, the difficulty of finding judges or juries competent to investigate the relative commercial value of manufacture is almost insuperable; but supposing them found, there is seldom a satisfactory mode of of testing the two most essential points in the most valuable manufactures—*cost* and *durability*. At the time when our Admiralty gave the prizes for chronometers, which have lately been discontinued, the timekeepers entered for competition were tried for at least twelve months in icy and torrid temperatures; they were baked and frozen; but, at a great international exhibition, the judges have scarcely twelve minutes at their disposal for examining each article. At the Paris Exhibition of 1856, it is within our present knowledge that a great many of the English machines were rewarded and rejected without being examined or tried at all.

An essay, recently published in a French scientific journal, on French manufactures, states, as a matter of boast, that a local patriot gave orders for the manufacture of cutlery, for competition at the Exhibition of 1855, specifying that the cost was to be a matter of no manner of consequence. Under the circumstances, that was, perhaps, quite fair. The object was, to rival Sheffield, and win a medal to exhibit to Europe as a triumph of French skill. The Exhibition was a race—not a market; and the exhibitor was satisfied to win at any price. But the result proved nothing, and the prize, when allotted, was only an advertisement, which deceived the public into believing that the prize specimens were *samples!* The prize system, except where a practical trial is possible, produces a large crop of articles like Peter Pindar's razors—made, not even to sell, but to show under a glass-case. It may be very proper to reward objects of public utility, for which there is no public demand, and which, therefore, cannot be rewarded by the monopoly of a patent—as, for instance, a life-boat or a diving-bell; just as it is worthy of a great nation to pension and provide for illustrious men engaged in important, yet unprofitable, scientific pursuits. The funds are not wasted which provide learned leisure for great astronomers, mathematicians, or physiologists. But who would think of proposing a pension for the most eminent barrister, accoucheur, or civil engineer—knowing, as we do, that such men will be, and have been before they became eminent, amply rewarded by the public support? It is not less absurd to offer prizes for articles where value cannot be tested, and where consumption is constant. The reward of coat-makers and boot-makers, watch-makers and carriage-builders, upholsterers and boat-builders, saddlers and hatters, may safely be left to the discriminating public, who require the articles they sell. No prize that can be offered will have any effect on the pianoforte or musical-instrument trade. How are razors to be tested, and who is to decide on the rival pretensions of telescopic dining-tables and easy-chairs? There may be some rules of tastes, perhaps, laid down for the occasion, by which the respective merits of designs in carpets and curtains may be settled, although the wearing qualities must remain a mystery; but how about grates, stoves, and cooking-apparatus—are they to be tried in July, at the risk of roasting and stewing the jury? The dignity of the office would, no doubt, attract martyrs amongst the class, who have more confidence than knowledge. The race of Dogberry is not extinct, and never will be. It was, a year or two ago, the proud boast of a gallant colonel—one of the best-dressed and least practical or scientific members of the council of the Royal Agricultural Society—that he had passed a whole morning in a temperature of 80°, testing the merits of churns. "True, colonel," was the unkind reply of an outsider; "but you gave the prize to a churn no farmer has ever, or would ever, use." We are afraid the amateur decisions on cooking-ranges would not command more respect than those of the amateur dairyman. Pleasure carriages present as many difficulties to a trial of comparative merits and value, as chairs and tables. The designs are a matter of taste, and varnish and paint cover a multitude of sins.

Turning from articles of domestic necessity and luxury to machinery,—such as printing-presses, mills, pumps, and steam-engines, we defy the most zealous advocate of the prize system to devise any trial that would be useful to the classes who purchase such articles. The most elaborate machinery for assessing merit at a manufacturing exhibition, will be no more successful in distinguishing the articles exhibited into "good," "better," and "best," than if the juries were to be followed by porters carrying baskets of bronze, silver, and gold medals, to be tossed up in the air, and caught by the most dexterous exhibitors. The fact is, that in England, out of schools and universities, racecourses, animal and horticultural shows, prizes are wholly foreign to the genius of our institutions. We do not consider the protection or the rewards of Government essential to our social happiness or success. Honorary rewards for civil merit are reserved for our highest and lowest classes; a courtier obtains the K.C.B. cross, which an ex-Chancellor of the Exchequer declines, and Hodge receives a medal, a pair of corduroy breeches, and a sovereign, for thirty years faithful service. But in France, the man who plays cleverly on the fiddle, or invents a new bug-destroying powder, or sells an astonishing number of penknives, which will not cut, at a half-penny each, is pretty sure, *if of the right politics for the time being*, to be provided with at least one coloured ribbon for his button-hole. Thus each successive government, playing on the vanity of the people, makes medals, ribbons, and crosses so many bribes for good political behaviour, and encourages the notion that supreme wisdom on every subject reigns in official quarters. The most distinguished gentleman in France

is the one without a ribbon of any colour. The one thing wanting in the shape of scientific rewards in this country, is a more certain provision for men of genius pursuing science for the sake of science—men like Sir Humphrey Davy and Sir Charles Bell; in order that they may not be compelled to waste their time in mere bread-and-cheese work. Medals for manufacturers of ploughs, and pumps, and coffee-pots, are of about the same value as prizes for poems and conundrums.

The surveyor and the sanitary inspector of Newcastle-upon-Tyne have had the pluck and good sense *not* "to treat with contempt" a very laboured attack on their omissions and commissions, which has formed one of a series of articles in an architectural contemporary. In this series, the object has been to show that there is no sanitary salvation out of the school of Edwin Chadwick, C.B., and no sewerage or water-works worthy of praise or imitation except those executed on Chadwickian principles by Rawlinson, Rammell, and Co. It would be impossible to investigate the sanitary condition of any ancient, populous, and prosperous port without finding a good deal that required amending both in the structures and the habits of the lower class of inhabitants. The plan of the writer referred to seems to be to glut his readers with disgusting, exceptional details, in order to lead them to infer that the municipal authorities and their officers are torpid and ignorant, or both; and to conclude by insinuating that a great improvement would be produced by superseding the power of the local authorities by a London central board, by a revival of the Board of Health which died of its engineering failures, with a staff of engineers and medical inspectors of the tribe who followed, fawned, and flattered the great sanitary Charlatan. To complete the anti-municipal case, comparisons are made between boroughs like Liverpool and Newcastle, and villages like Alnwick and Morpeth. The sanitary censor of the *Builder*, who has taken Newcastle-on-Tyne for his subject, would lead his readers to infer that "Newcastle abounds with accumulations of filth of every description," and is characterized by an absence of proper sanitary arrangements, "probably on the eve of some frightful visitation." The authorities having "learned nothing from the visitation by the cholera in 1854, have done nothing; and that the work of sanitary reform, as regards Newcastle, has as yet to be commenced." Messrs. Thomas Bryson and Thomas Dawson, the borough surveyor, and sanitary inspector, show first that the statements of their censor as to certain nuisances are not to be relied on; that the writer does not even know how to observe correctly; and next, they describe what has been done by them under the orders of the municipality, for the improvement of a town which, at one time, like every other town of the same class, was in a very disgusting state. We shall not follow the writers through each of the paragraphs devoted to the W.C. question, in which they convict the sanitary critic of a series of misstatements, probably not intentional, but the result of carelessly inquiring, and willingly believing what he wished to believe—as, for instance, where he asserts that an opulent quarter is "destitute of private accommodation," when it is proved by the water companies books that this quarter contains one hundred and three private water-closets; again, he describes the quarter of Newcastle, called Sandhills, as "exceeding Cologne and Cairo in stenches and filth"—rather strong language, considering that Cairo has neither sewers nor water supply, nor scavengers, except vultures and dogs. Sandhills has a main sewer throughout its whole extent, with a net-work of branch drains. "The streets and all the entries are swept by scavengers twice every day. The company's water is on constant pressure over the whole district, almost every set of tenants having a tap for themselves, and those not so provided can obtain it in any quantity, free of charge, from fountains placed by the corporation at each end of the main street." The sanitary censor has forgotten to mention that this neglectful corporation have applied the Lodging-House Act, and appointed two police inspectors under it, thus securing ventilation, and attention to cleanliness and good order in all the licensed lodging-houses. "In order to remove refuse from those situations where there was no convenient space for building ashpits," or other "inspected" public or private accommodation, iron-covered carts, with low axles, traverse the localities every evening, a bell ringing constantly, to warn the tenants of the oldest part of the town to bring out their refuse. In answer to the charge that "There is no regular system of sewerage;" it is shown that since 1854, the date of the present surveyor's appointment, eleven miles of sewerage have been executed, in addition to sixteen miles previously existing; and these sixteen miles have been improved and brought into harmony with the new sewers where needed. As to the town roads, new flaggings have been laid during a period of seven years, at a cost of nearly £30,000, and squaring, paving, and chip stones, chiefly of Aberdeen granite, for carriage-way pavement, at a cost of more than £67,000; "the greater part executed so as to add two yards to the carriage-way, by dispensing with the old-fashioned broad channels." "There are thirty-two drinking fountains, furnished with galvanized iron cups—twelve provided with troughs, exclusively for the use of cattle and horses. There are also twenty places of accommodation, with provision for 111 persons, situate in suitable parts of the town, and fifty-four public urinals, the greater portion with water running constantly through them; these are all visited by scavengers twice every day. Since 1853, the corporation has applied itself to the compulsory removal of such nuisances as damp dwellings, foul middens, obstructed drains, &c., and 11,633 cases have been brought under the notice of the proper authorities. The corporation scavengers have, ever since 1854, regularly removed the ashes and refuse which were previously irregularly removed by farmers. In 1860, upwards of 32,000 loads were removed. "Seventy streets of the town are swept at least once every day, half the remainder thrice a week, and the other half twice a week." The sanitary censor, well trained in the school of Chadwick and Ward, and therefore dexterous in omitting notice of unpleasant truths which bear against his preconceived theory, and ingenious in cooking figures, winds up his caricature of the sanitary condition of Newcastle by stating that, "1200 lives were annually sacrificed in the town between the years 1839 and 1853, which might have been saved by proper sanitary precautions"—that is, by a Rammell or Rawlinson for engineer, and a Dr. Holland to look after the burials. At first sight, it seems odd that he should have taken 1839 to 1853, a period that could have nothing to do with the present sanitary condition of the borough, but further investigation shows that he took that epoch because the years between 1857 to 1860 would not serve his purpose. The registrar's returns show a striking improvement in the health of the borough in that period, viz.—

2740	deaths in	1857
2667	,,	1858
2667	,,	1859
2666	,,	1860

Thus, while the population has been increasing during the same period at the rate of 2000 a year, the mortality has positively diminished. The authors of this very complete reply to the sanitary censor of the *Builder* know their business too well to believe that Newcastle has reached sanitary perfection; but they have shown very sufficiently that municipal authority is infinitely to be preferred to the empirical experiments of the tools of that board of health which expired smothered in the vile scents created by its engineering failures.

Bills are before Parliament for protecting and encouraging the breed of salmon. That there is much need of amendment in the laws relating to our salmon fisheries abundant evidence before royal commissions and parliamentary committees has proved. Whether the elaborate machinery proposed for working out the bills, with its central board, is required, remains to be proved. A recent discussion in the French Legislature on fish cultivation brings out in formidable relief the tremendous army of officialism which exists in France. Some fourteen or fifteen years ago, a peasant, named Remy, re-discovered the art of propagating fish. From the hands of Remy the undertaking passed into the hands of a board, who have been at work about ten years, and now desire to transfer the fish-culture department from the Woods and Forests to the engineers of the Road and Bridges, who have also care of rivers. One of the advocates of this change curiously enough, maintains that in consequence of good official management, England derives nearly £100,000 from salmon fisheries, while France obtains barely £20,000 a year. The difference is much more likely to arise from climate, and quality of rivers, than from laws and police, because we know that our salmon-protecting laws are injurious, confused, and neglected—while in France, we learn that the Forest Department has seven hundred guards or gamekeepers under its direct authority, has distributed 800 medals to encourage fish cultivation, and issued 24,000 notices or processes for the protection of their finny charges. And still the fish cultivator is very much discontented. An influential

section of Scotch owners of sea-shore fishing rights are not at all satisfied with the proposed pro-salmon legislation. In a manner characteristic of rights vested, or assumed to be vested, they have sent in a memorial in which they argue first, that there is no real average diminution in the supply of salmon, and next, that, if legislative restrictions are required, they should be confined to rivers, and leave the sea-shore engines of destruction alone. This document is ingenious, and we give the following extracts for what they are worth, observing that in discussing proposed legislation, it does not follow that, because an evil exists, the remedy proposed by an Act of Parliament is the best possible remedy. "Salmon," say the memorialists, "caught in the sea is delicious food; it feeds in the sea, and breeds in the river; in the sea, it grows fat, in the river, it rapidly deteriorates. The river necessarily calls for careful regulation, not only from its being narrow and so easily commanded, as always to be exposed to over fishing, but also from its being the spawning and rearing bed of the salmon, and a place where poachers, and its natural enemies," otters, rats, and trout, abound. "If the Legislature wish to promote the breed, and capture of salmon best suited for food, the most efficient course would be the total prevention of river fishing, leaving the public to get their whole supply from the sea. Such legislation, the memorialists argue, would not be more unfair than the proposed total suppression of stake and bag nets," but it has never been asked by sea-coast proprietors. It is expedient to permit the take in the sea, where they are the finest flavoured. They deny that salmon hug the shore so closely as always to be within range of nets, because they urge, salmon have been seen leaping seven or eight miles from shore—a rather curious way of proving a negative. The memorialists approve of the clauses of the Scotch Salmon Bill, introducing an increased annual close time, but object to abolition of their own stake, bag, and cruive-nets. They assert that there is no falling off in the supply of salmon, for that the river and sea combined send just as many salmon to market as they did fifty years ago, although more goes from the sea, and less from the rivers. They call for a definition of the boundaries of estuaries to settle where the sea ends, and fresh water rights begin. They object to allowing rod fishing to be continued fifty-six days after the commencement of the annual close time, "because anglers are so skilful now-a-days, that their exertions would affect the breed," and "would moreover, induce a belief amongst the common people that taking a fish in any way at a time when rod fishing is permitted to gentlemen, cannot be morally wrong, or seriously detrimental." The intervention of a central board they consider unnecessary and objectionable.

By a printer's error in our last "Notes," the title of M. Proudhon's work was hashed; it should have been "*Proudhon's Histoire de Progrès.*"

Circular to Gas Companies.

We did not expect that it would have been necessary, at the present day, to have said anything in defence of the safety of gas lighting. We imagined that the notion, that the burning of coal-gas was a more dangerous means of illumination than the burning of oil or candles, had become extinct, and that it belonged to the time when no lamplighter could be found bold enough to light the public gas-lamps, and when it was thought dangerous to touch a gas-pipe lest it should burn the fingers. But it seems that a relic of those times has been preserved in the British Museum, like the lions of Halicarnassus, the winged bulls of Nineveh, or other monstrosities of antiquity.

The trustees had lately under consideration a proposition for lighting the collections of the Museum, and of opening them to the public after dark, and copies of the evidence taken on the subject, and of the resolution adopted in consequence, have been presented to the House of Lords. It appears from this return that Mr. Panizzi, the principal librarian, whose antiquarian studies have evidently disinclined him to modern improvements, wrote to Mr. Braidwood, the superintendent of the London fire-engine establishment, to ask his opinion if the lighting could be safely done. Though Mr. Braidwood is unquestionably very good authority as to the means of extinguishing a fire, we think he is scarcely the best person who could be referred to for the purpose of devising the safest means of illumination; and, in his answers to the queries submitted to him, he wanders into the consideration of the products of the combustion of gas, which is most assuredly out of his province. As regards the simple question whether there would be any danger in lighting the interior of the Museum for the admission of the public, we conceive there can be but one opinion. Some danger would attend it, whatever mode of illumination was adopted; but the fire insurance offices, which are the best authorities in such matters, have affirmed, by their practice long ago, that there is less danger from gas lighting than from oil or candles. Not so, however, Mr. Braidwood, who, in opposition to the fire offices who employ him, asserts that, "under good management," the building might be lighted with candles or oil with comparative safety; but that, if it were to be lighted with gas, "the question assumes a very different aspect." He then proceeds to affirm that the gas "dessicates everything within its reach, rendering the ceilings, &c., more inflammable than they would otherwise be;" that "the heat and fumes evolved by the combustion of gas, are most decidedly against the preservation of any vegetable or animal substances, and tend to discolour stone, marble, &c.;" and he concludes by referring to Mr. Warington as agreeing with him, "as to the destructive tendencies of the vapour evolved during the combustion of gas." The eminent chemist referred to has, however, placed on record his opinion to the contrary, in so decisive a manner, in his joint report with Dr. Leeson, "On the Salubrity of Coal-Gas," in reply to Dr. Letheby, that we cannot but consider Mr. Braidwood very unfortunate in his reference. He must surely have mistaken the name of his authority, and have intended to refer to Dr. Letheby, whose statement, that oil of vitriol is generated by the combustion of coal-gas, Mr. Warington and Dr. Leeson disproved and ridiculed.

The only parts of Mr. Braidwood's evidence that really bear on the question, are those wherein he attributes the danger of gas lighting to the heat it generates, and to the possibility of leakage and explosion. With respect to the former, it may be observed, that "the dessication of the ceilings" can only take place when the burners are placed recklessly close to them, and that the quantity of aqueous vapour generated by the combustion of gas tends to moisten, rather than to dry every thing within its reach. It is true that large "sun-burners" placed near to the ceiling, with ventilating tubes to carry off the products of combustion, require great care in fitting, but there is not so much danger in them as in hot-air pipes and flues. Mr. Braidwood may not have inspected the collections at the British Museum during the ordinary hours they are open to the public in winter, or his sensitiveness to danger would have been excited by the immense glowing furnaces on the wooden floors of the galleries that contain some of the most valuable manuscripts, prints, and autographs in the Museum. It must require some special contrivances, and very careful management, to prevent danger from the hot flues that carry under the floor the draft from those masses of incandescent fuel; and, if that danger has been sufficiently guarded against, as we hope it has been, there could be comparatively little difficulty in guarding against danger from the heat emitted by any number of gas flames required for illumination. We cannot deny that there would be a possibility of explosion, should the attendants culpably neglect their duty; but the least leakage of coal-gas is so readily detected by the smell, and the quantity that must escape into such spacious galleries as those of the British Museum must be so great before its mixture with atmospheric air would become explosive, that it is next to impossible such an accident could occur. Even if it did, the effects would not be so destructive as Mr. Braidwood imagines. There seems to be no distinction in his mind between one explosive force and another; for he speaks as if an explosion of gas were as violent as an explosion of gunpowder. "It must not be forgotten," he observes, "that the more substantial the building is, so much more destructive is the explosion;" and further, "those parts which are most solidly constructed, and of the heaviest materials, will suffer most in case of an explosion." We infer from these remarks that, in the course of Mr. Braidwood's long experience, very few cases of gas explosions have come under his notice, otherwise, he must have known to the contrary, An explosion of gas may blow out windows, burst open cupboards, tear asunder internal fittings, and occasionally carry away a slight roof or ceiling, but we may venture to say that exploded gas never destroyed solid masonry. The force of the most explosive mixture of coal-gas and atmospheric air is, indeed, comparatively very feeble.

The expansion of the gas and air by heat, at the moment of explosion, does not exceed seven times their original volumes, and the result is nearly a vacuum; whilst, by the explosion of gunpowder, permanent gases are generated that occupy several hundred times the space of the solid matter exploded. Mr. Braidwood has evidently never seen oxygen and hydrogen gases exploded harmlessly in a glass bottle, or his notion of its uncontrollable force would have been less erroneous. He seems, indeed, to know as little about the mechanical effect of the explosion of gas as he does of the results of its combustion; and we beg to recommend the superintendent of the London fire-engines to attend, in future, to the maxim, "*Ne sutor ultra crepidam;*" which may be translated, in his case—Stick to water, and don't meddle with gas.

Mr. Smirke, the architect to the British Museum—the only other person whose opinion on the subject was asked by Mr. Panizzi—concurs with Mr. Braidwood in those parts of his report respecting which there can be no difference of opinion; but he carefully guards himself against being implicated in the superintendent's notions about gas. He agrees that there would be great danger in using sun-burners, without proper precautions; that gas will escape from defective pipes or bad joints; and that it may escape, also, if there be carelessness or negligent management: hence, he doubts the expediency of introducing gas into the interior of the Museum. The trustees have, on this evidence, come to the conclusion, "that they would not be justified in allowing the collections of the British Museum to be open at any time which would require gaslight." We do not object to that decision, for there can be no doubt that the lighting of the interior of the building, by any means whatever, must be attended with some additional danger; but we do object most strongly to making the question of opening the collections to the public after dark subservient to the revival of the bugbear of the danger of gas lighting. That mode of illumination has been proved to be safer, as well as more economical, than any other; and, notwithstanding Mr. Braidwood's evidence to the contrary, we have no more apprehension that it will ever be supplanted by oil or candles, than we have that the winged bulls of Nineveh, or the Egyptian figures, in the British Museum, will be selected as models of nature by modern artists.

The agitation in Scotland for cheap gas is extending, and the gas companies there do not appear to be taking any efficient means to check it. To reduce the price, after the clamour has been raised, is a poor expedient that only serves to show there was justice in the outcry, and tends to encourage agitation in other places. This is not the time for asserting absolute rights, nor for the maintenance of proud reserve; the gas companies ought to take the public into their confidence by publishing full and clear statements of their affairs, showing the actual cost of coal and materials for the manufacture of 1000 cubic feet of gas, the expenditure for renewals and repairs, the expense of management and distribution, and the profit derived from the quantity of gas sold and paid for. If that were done fairly, fully, and freely, the respectable gas consumers would feel satisfied, and would be no longer misled by the exagerated and false statements of agitators, which, though they may fail to raise any substantial opposition, excite discontent and enmity between the gas companies and their customers, which is annoying and prejudicial to all.

The town of Kirkaldy is about to be visited by Mr. Flintoff, who is advertised as "the gas engineer from London, who has exposed gas abuses, and has saved more than £250,000 a year to the gas consumers of " (thirty-five towns are named) "by his improvements in connexion with lighting towns with gas." London, Liverpool, Edinburgh, Dublin, Glasgow, Manchester, Cork, Bath, Bristol, Stockport, and Whitehaven, are among the towns mentioned as having participated, without knowing it, in the boon which this great public benefactor has bestowed. He seems, however, to have met with poor return for such immense benefits, for he is compelled at Kirkaldy to charge twopence for admission to his lecture, to defray expenses; certain front seats, which ladies are invited to occupy, being reserved for sixpenny visitors. Some of Mr. Flintoff's friends in Edinburgh feel indignant at the revelation of his antecedents by Mr. Young, and a protest in one of the papers denounces the scandalous pamphlet which Mr. Flintoff was stated to have published when he kept a book-shop in Fleet Street, as a forgery. It is, indeed, a publication of which any one concerned with it has reason to feel ashamed; but, unfortunately for Mr. Flintoff, it is no forgery. We happen to possess an original copy, illustrated with wood-cuts, executed in a style appropriate to the text, which was purchased at Mr. Flintoff's shop, and received from his own hands; and we shall be happy to show it to any one who is curious in such matters. It was afterwards reprinted, with certain notes and comments, and with an appendix containing a police report of a charge against a person who was libelled in the pamphlet for having personally chastised Mr. Flintoff in his own shop. It is probable that that reprint is the publication which Mr. Flintoff's vindicator alludes to as a forgery.

Mr. Hughes has been travelling with his "Cooper's tube" to Guildford; and, by the joint agency of that instrument and the photometer, he has tested the gas, and found it wanting in illuminating power. That, or any other result, might be obtained by such a mode of analysis; but it serves the editor of the *West Surrey Times* for a topic, in the lack of other matter, and he pours forth his indignation against the gas company for defrauding their customers of their legal quantity of light. After the exposure, during Mr. Hughes's cross-examination before the committee on the Bolton Gas Bill, of the fallacy of his method of using the bromine test, with its varying coefficient obtained with the photometer, we need scarcely say that little reliance is to be placed on such experiments. Mr. Hughes seems to imagine that there is much virtue in the use of two instruments, and that the errors of one must be corrected by the other; but it was clearly shown that, instead of correcting errors, the mistakes of the tube are multiplied by the mistakes of the photometer, and by this means a variation of two or three candles in the estimated illuminating power of gas can easily occur. With such facility for committing error at his command, it is not surprising that at one time Mr. Hughes estimates the illuminating power at several candles more than the gas companies claim, as at Birmingham, and that at other times he makes it several candles less than it is, as at Guildford, where the gas is continually tested with accurate instruments, and we have good reason to believe that it has never been found below the parliamentary standard.

An awkward complication has taken place at Sheffield, in consequence of the town council having employed the inspector of meters to analyze the gas, as a means of occupying his time while waiting for the standard gasholder and other apparatus from the Exchequer Office, though a competent analytical chemist was appointed by the town council to perform the same duty. The meter inspector ought to have declined undertaking so invidious an office; but, not wishing to disoblige his employers, he commenced testing the gas, though provided with very imperfect apparatus, and the results of his analyses, as might be expected, differed considerably from those of the chemical examiner, and represented the gas to be deficient in illuminating power. The town council, on receiving the extra-official report, without waiting for that of their recognized analyst, passed a resolution to the effect that the gas manufactured by the gas company was neither so good nor so cheap as it ought to be, and requesting the company to reduce the price and improve the quality of their gas. The directors, though feeling aggrieved at such a request, as the reports of the town council's own chemist proved that the gas had, on the average, exceeded the Parliamentary standard no less than 48½ per cent., nevertheless sent a courteous reply, assuring the town council that a further reduction in price would not be deferred longer than necessary, though an increase of illuminating power could not be expected, considering how greatly it already exceeded that required by their Act. The varying reports of the meter inspector and the chemical examiner formed the subject of an angry discussion at the last meeting of the town council; and Dr. Bingley, the chemical analyst, contended in his report that the mode of testing adopted by the meter inspector was very imperfect. That could scarcely fail to have been the case, as the only instrument supplied to him by the town council was Dr. Fox's shadow meter, which is but a rude kind of photometer, that has no graduated scale to indicate variations of light between 16 candles and 25 candles. On the other hand, it must be observed that the employment of wax candles in Dr. Bingley's photometrical experiments is calculated to give variable results, according to the condition of the wick, and should be discontinued. Experience has proved that sperm candles only should be used; and, for the sake of uniformity, 13·8 sperm might be adopted as the equivalent of 15·8 wax, as practised by Dr. Letheby. The town council were, however, bound to be guided by the report of their own examiner; and,

for the conflicting reports, and the complication that has arisen from them, they have themselves alone to blame. The temperate tone of the directors of the gas company, in answer to the hasty resolution of the town council, has prevented much of the inconvenience that might have been caused by that proceeding; and it is to be hoped, now that the inspector of meters has been supplied with a standard gasholder and other apparatus for commencing his legitimate work, that he will be more appropriately occupied than in making competing analyses of the gas with the officer already appointed to do that duty.

The proceedings on the Elland Gas Bill, reported in another column, are an instance of the manner in which the forms devised by Parliament for the protection of the public may be converted into instruments of abuse and oppression. The valley of the Calder, in the West Riding of Yorkshire, has lately become a favourite site for the erection of manufactories, and the townships of Elland and Stainland, comprising about 5800 acres out of the 75,470 acres, which form the parish of Halifax, have been, since 1836, supplied with gas by a company established at Elland. The district is a very peculiar one, consisting of straggling villages which have risen up round the factories, some of them in the valley, and others at than 3000 inhabitants, and the whole requiring 9¼ miles of main-elevations of 500 feet, none of them, however, containing more pipes for the yearly distribution of 9 million cubic feet of gas to about 320 consumers, and sixty-five public lamps. The price charged has been 5s. per 1000 feet, subject to discounts to large consumers, which has reduced the average to about 4s. 6d., the minimum being 3s. 4½d., with the exception of the public lamps which have been supplied at about 2s. 3d. Something like £11,000 has been expended on the undertaking since its first establishment, and the proprietors, being of opinion that the time was come for their obtaining statutory powers, applied this session for an Act, which they have succeeded in obtaining, in spite of an opposition of an unusually virulent character fomented by the town-clerk of Halifax, with the aid of the borough engineer and Mr. Geo. Anderson. After subjecting the promoters to all the expenses attending a threatened opposition in the Commons, and failing to present themselves when called upon, the opponents appeared in force in the Lords, and by this course have subjected the promoters to an expense which will for ever add something like 4d. per 1000 feet to the cost of gas in Elland; and it is, no doubt, in consideration of this that a departure from the usual rule of Parliament has been permitted in this case, and a dividend of 10 per cent. has been allowed on the new capital to be raised under the Act, without any restrictions as to the appropriation of the new shares. We can scarcely conceive anything more humiliating than the rebuke administered to the town-clerk of Halifax by the refusal of the Lords to make any alteration in the bill as sent up by the Commons; nor will Mr. Anderson feel himself flattered by his failure to impress any of the parliamentary committees, before whom he has this session given evidence, with sufficient confidence in his judgment to warrant them in adopting his views.

The interesting paper read, on the 16th ult., by Mr. Perkin, before the Chemical Society, "On the Colouring Matters derived from Coal-Tar" (the first portion of which will be found in another column), is an elaborate exposition of the present state of our knowledge on a subject which threatens to effect a complete revolution in the source from whence our most brilliant dyes will be for the future obtained. Since Mr. Perkin's paper was read, the *Comptes Rendus* of the *Académie des Sciences* announces the discovery, by M. Roussin, of a process by which brilliant red, violet, and blue colours are obtained from naphthaline, of which we shall give some account in a future number. There, however, still remains a great deal to be done in utilizing the other products of coal-tar, such as the dead oil and pitch, and generally in the mode of conducting this new manufacture, so that the tar produced in the small gas-works may acquire some value, instead of being, as it now is, a drug and an incumbrance.

Register of New Patents.

2882.—William Renwick Bowditch, of St. Andrew's, Wakefield, York, clerk, for "*Improvements in the purification of coal-gas and of coal-oils.*" Patent dated Nov. 24, 1860.

To carry out the first part of this invention, the patentee proceeds as follows:—Coal-gas (preferably that which has undergone the ordinary process of purification) is passed through or over the hydrates of potash, soda, baryta, magnesia, or alumina, or the oxides of manganese and of iron either in the hydrated or anhydrous condition (except hydrated peroxide of iron. Other oxides, such as those of copper, zinc, or tin, will produce the same effect; but, at their present prices, they are found to be too expensive. Or, the gas is passed through a mixture of any of these substances, placed in any suitable vessel; the substance or substances employed being in each case heated to a temperature between 120° Fahr., and a temperature short of dull redness, the best temperature being about 300° Fahr. The aforesaid materials, except potash and soda, are best fitted for use in purification of coal-gas, when they are in small lumps, from the size of a pea to the size of a walnut, as the gas then passes through them with facility. If in a state of powder, they may be formed into small lumps, by moistening with water and stirring until they aggregate into lumps. They are then to be dried, and to have the dust sifted out, when they are ready for use in the hot purifiers. The best temperature for drying these substances is from 200° Fahr. to 300° Fahr. Potash and soda are best employed when dissolved in a small quantity of water and absorbed by bricks broken into small pieces. When saturated with the alkaline solutions, the bricks are ready for use in the hot purifiers.

The vessels employed to hold the heated purifying materials may be of any form, size, or material found convenient. It is preferred to have them cylindrical, and of cast iron, with a door at each end. Each vessel should have an outer metallic casing or jacket, made steam-tight, so that steam may be employed as the source of heat to the purifying materials, such steam being applied by injecting it between the purifying vessel and its outer coating; or water may be converted into steam within the space between the purifier and its jacket by a direct application of heat to the outer jacket. It is preferred to pass in steam, heated to the proper temperature, and not to use direct heat if steam were available.

The purifiers may be fixed vertically, or at any convenient angle with the horizon, which will allow the purifying material to occupy a space within in such a manner as that no gas can pass through without coming in contact with, and passing through, the heated purifying material. They need not be more than three or four feet in length, and should be of such breadth as will allow a ready passage to the maximum quantity of gas made. Each purifier should contain about three feet of purifying material, disposed in one or more layers as preferred, through which the gas should be made to pass. The purifying material should be renewed from time to time, according to the quantity of gas manufactured, as a competent workman will soon ascertain.

The gas, which has passed through the hot purifiers, is to be cooled in the ordinary manner, and to be passed through cold purifiers of the ordinary kind, containing slacked lime or slacked lime and oxide of iron, after which it is fit for use. It is preferred to subject the gas to the ordinary cold process of purification before using the above process, as then the hot purifying material will not become clogged by tar and cooled by water which have passed the condenser; but these will have been deposited in the cold purifiers. This process may, however, be applied to gas as soon as it leaves the condenser, before it passes into the ordinary purifier, but with less effect and more trouble than when the gas has been first subjected to the cold process of purification.

This invention may be applied to gas by consumers upon their own premises; in which case, the gas which leaves the meter is made to pass through a small purifier, containing the above-mentioned purifying materials, heated to about 300° Fahr.; and, subsequently, through another purifier, containing layers of ordinary cold, slaked lime; after which it may be burned. The pressure of gas upon consumers premises is not often sufficient to overcome much resistance; wherefore, the cold-purifying materials should have the dust sifted out, and then the gas will pass through the purifiers without any perceptible loss of pressure.

Another part of this invention is the passing coal-gas, together with steam, through or over charcoal, coke, or mixtures of these, or either of them, with alkalies, or through the materials hereinbefore named, or mixtures of them, heated between 212° Fahr. and a dull-red heat, preferring for the latter materials a temperature of about 400° Fahr. For this purpose, the charcoal or coke is broken into small pieces, from which the dust is sifted, and (if alkalies be used) the charcoal or coke is saturated with concentrated solutions thereof, when it is fit for use in the hot purifiers.

Coal-gas contains steam or vapour of water, and, when the gas containing this normal quantity of vapour is passed through, or over, the above-named materials, some of the sulphur, which was before irremovable, can be removed by cold, slaked lime. It is preferred, however, to add to the gas more steam than it contains naturally, and the best plan is found to be to send the gas over the surface of water, heated from about 140° to 180° Fahr.; and, subsequently, through the above-named heated materials. The quantity of steam thus carried by the gas is found to be the best which can be employed. The surface of heated water should be about 25 superficial feet for each 50,000 cubic feet of gas made per hour. When steam is generated at and above the boiling-point of water, and passed with gas into the hot purifier, a considerable amount of illuminating matter is abstracted from the gas, without any corresponding advantage in point of purity. The charcoal or coke, when used alone, may be heated to about 500° Fahr.; but, with alkalies, it should not be heated above 300° Fahr. When the gas leaves the coke or charcoal, it is to be cooled and purified, as above described.

Another part of this invention is the passing coal-gas, with steam, through heated pipes, or other suitable vessels, which will contain the gas and steam. In carrying out this part of the invention, it is preferred to use pipes or other suitable vessels, heated to about 500° Fahr., and filled with any inert material, such as broken bricks, to afford surface of contact, so that the gas and steam may be brought into intimate contact. A pipe or vessel 4 feet long, filled with bricks or other inert material, will be sufficient; but, when nothing is used to fill up the heated pipes or vessels, this should be from 8 to 10 feet in length. The aqueous vapour existing in gas will of itself suffice to convert a part of the irremovable sulphur compounds of gas into removable compounds; but, it is preferred to add steam, and to effect this the gas is passed over a surface of heated

water, as is above specified, after which the gas is to be passed through the cold purifiers, as above described.

Another part of this invention consists in passing coal-oils (that is, such oils as are obtained by the distillation of coal, schist, or coal-tar) through vessels containing any of the above-named substances heated to about 380° Fahr., and prepared, as directed, for use in the purification of gas. The best and most economical substance of all the above-named, is found to be binoxide of manganese, and the best mode of proceeding is to take the coal-oil, after it has been treated with acids and alkalies in the usual way, and to distil it over the heated purifying material. When condensed, the coal-oil is to be washed with alkali, and subsequently with water, upon which it becomes nearly or quite colourless, and of a pleasant odour. When the washing, as directed, after it has passed through the heated purifying material, does not produce an oil of good colour and odour, the hot manganese or other purifying material should be changed.

The patentee claims, as to the first part of his invention, the application to the purifying of coal-gas of the substances named in describing that part, heated, and having the gas transmitted through them, subsequently to which the gas is passed through the ordinary cold-purifying materials described, by which treatment of gas, injurious matters therein, irremovable by the ordinary coal purification, are rendered removable, and are removed. He claims, as to the second part of his invention, the passing coal-gas with steam, either that ordinarily contained in it or added to it, over the substances named in describing that part of his invention, and in manner described, whereby a similar effect is produced. He claims, as to the third part of his invention, the passing gas through pipes or vessels as above described, whereby a similar effect is produced; and, he claims, fourthly, the purification of coal-oils, as herein described.

2910.—Vincent Wanostrocht, of Parkstone, near Poole, Dorset, for "*An improvement in the manufacture of mineral tar.* Provisional protection only obtained. Dated Nov. 27, 1860.

This invention has for its object an improvement in the manufacture of mineral tar, and consists in the introduction, or application, in such manufacture, of a mineral not hitherto employed therein, in order that tar may be distilled therefrom. The mineral so employed and applied is the class of mineral found in Shropshire, and known in that district as "tarry rock," "stinking rock," and "sixteen yard rock," and possibly by other names in that and other places, and the products thereof, when subjected in ordinary retorts or stills to a low heat, say about 600° or 800° Fahr., are tar and a residue of sandstone.

The mode of heating the retorts or stills, and the mineral therein, may be greatly varied, so long as the mineral is kept heated to the lowest degree of heat that tar will go off therefrom freely in the state of vapour, which is received into a suitable condenser. It is preferred that the uncondensed vapours from the condenser should be received by a suitable apparatus, and caused to flow back into the retort or still, and thus aid in carrying off all the heavier vapours, as they come from the heated mineral. Such retorts or stills may be heated externally by fire, or internally by superheated steam, or the carrying off of the heavier vapours, when a retort or still is heated externally, may be aided by ordinary or heated steam being admitted. To the mode of heating the retorts or stills used, or mineral therein, no claim is made, the means resorted to being in themselves old, when applied to other minerals. The stills or retorts employed should have large outlet-passages, and by preference at or near the lower parts thereof.

2958.—Richard Edward Keen, of 15, Old Change, London, for "*Improvements in cocks, taps, valves, and other apparatus for stopping and regulating the flow of liquids, steam, and gas.*" Patent dated Dec. 3, 1860.

This invention consists, first, of the arrangement of the several parts of the apparatus in such a manner as to form a combination of two or more distinct means of stopping, or regulating the flow of the liquid, steam, or gas (each capable of being made to act in the absence of the other), by being so formed and disposed that the flow of the liquid, steam, or gas, passing through the apparatus is first checked by the sliding, turning, or otherwise passing of one or more portion or portions of the apparatus, over, into, or across the aperture through which the liquid, steam, or gas, flows, and is finally stopped by the same, or other portion or portions, forming with, or without the remaining part or parts of the apparatus, a valve and seating, or plug and socket, to be assisted or not as occasion may require by further means of stopping and detaining the same, and consequently providing at least double security, the pressure being so checked by the first part of the action, and the resistance thereof so sustained by the parts, when at rest, that the valve-parts of the apparatus are protected not only from the strain and wear, but also from corrosion, and other prejudicial effects consequent upon the constant pressure, or other action of the liquids, steam, or gas upon them.

The objects of this part of the invention may be attained in various ways. For instance, the plug of the cock may be cylindrical with a conical bottom, and may, by means of a screw-lever crank, cam, slot and pin, rack and pinion, or any other agency, be made to slide up and down in the cylindrical portion of the body across the aperture or water-way, to check the pressure, and may form with the bottom or conical portion of the body or outlet, a valve to stop the flow of the liquid, steam, or gas; or the plug may be formed and turned round, as in cocks of ordinary construction, to check the pressure, and be made to raise and lower (by a screw, or any other known means) a loose valve at the bottom, as in ordinary valve-cocks, to stop the flow of the liquid, steam, or gas; or a slide-valve, or a flat-valve, of ordinary construction may be used to cover the orifice of the water-way, or the shank or body may be made of two tubes—one inside the other—and each having an aperture or water-way in its side to correspond with that in the other, so that, one being fixed by sliding or turning the other, the two apertures may be brought together to open the water-way, or separated to close it, in lieu of the plug to check the pressure—any of which may or may not be accompanied by or connected with an ordinary valve at the bottom of the body or outlet to stop the flow of the liquid, steam, or gas. But, by preference, a cock, made in the form of the letter T, is adopted, turned round so that the head may be in a vertical position, and constitute the shank or service-way.

The chief advantage which cocks of this description possess over those in ordinary use consists in the total absence of friction, and the comparative freedom from corrosion in the parts constituting the stopping or regulating medium.

The claims are—

1. The combination, disposition, and arrangement of any two or more parts of the apparatus (each capable of being made to act in the absence of the other), in such a manner that one will assist and protect the other, as hereinbefore first described.

2. The formation of the several parts in such manner that under pressure they are self acting, as hereinbefore secondly described.

2916.—John Robb, of Aberdeen, N.B., merchant, for "*Improvements in gas-stoves.*" Patent dated Nov. 28, 1860.

This invention consists of certain arrangements in the construction of gas-stoves, whereby a considerable amount of heat is obtained and distributed through the apartment, or place to be heated, without the objectionable circumstances frequently attendant upon the contrivances previously in use.

The method of construction which is preferred as embodying the principles of this invention is as follows:—The base or bottom of the stove is composed of metal, stoneware, or other suitable material, and may be made of any desired shape, and ornamented and coloured to suit various tastes. Upon this base is placed a cylindrical vessel or chimney, hereinafter termed the "mixing-chamber," and into which the gas is conducted by means of an ordinary pipe and burner, or pipes and burners, the top of the cylinder being covered with wire gauze, or with a plate of perforated material, through which the gas passes, after having been previously mixed with atmospheric air in its passage through the mixing-chamber, the gas being ignited above the wire gauze or perforated plate.

The material which is preferred for the perforated plate is that called "adamas;" but any other material, capable of resisting the action of the heat evolved from the ignited gas, and otherwise suitable for the purpose, may be employed.

The atmospheric air is introduced into the mixing-chamber for the purpose of being mixed with the gas by means of a tube formed of iron, or brass, or other suitable material, which tube communicates at one end with the external air, and, after passing over the ignited gas, and thus heating the air contained therein, enters the mixing-chamber at a point below the gas jets, the gas being thus intermixed with the air before passing through the wire gauze or perforated material. The tube by which the air is conveyed to the mixing-chamber may be carried in the form of an arch over the gas jets, or may be arranged above the same in a coil; or any other convenient method, admitting of the proper heating of the air previous to its admission to the mixing-chamber, may be employed.

The mixing-chamber is surrounded by a glass cylinder open at the top, and so supported as to allow of the free passage of air beneath its lower edge into the interior thereof. This may be effected by raising the cylinder above the base or bottom of the stove, or by perforating the latter so as to admit the air. The upper end of the cylinder is partially closed, an opening being left at the top of considerably less diameter than the main body of the cylinder; such opening being covered with wire gauze, or perforated material. Above the glass cylinder is a dome-shaped cover of glass or metal, or other material, the same being of greater diameter than the cylinder, and a clear space being left between them; the effect of the dome being to intercept the heated air, and diffuse it through the apartment or place in which the apparatus is situated. The dome may be either suspended over the stove, or it may be supported by arms attached to the glass cylinder. In order that the glass cylinder and dome (where the latter is constructed of glass) may be protected from injury, a cover, constructed of wire network, or of perforated metal, may be employed, and which exterior cover may also, if preferred, be employed to support the dome.

In some cases, it may be desirable to heat the gas before it is used, and this is effected in the following manner:—In place of the mixing-chamber, a similar receptacle is employed, but without any communication between the interior thereof and the external air. Around the exterior of this receptacle or chamber, which is kept full of gas and supplied thereby, are arranged any necessary or desirable number of burners; the gas from which being ignited, heats the gas in the chamber, which latter furnishes a constant supply of heated gas to the burners, thus largely increasing its calorific properties, and securing the complete consumption of the burned gas, while all unpleasant odours and injurious effects are avoided, and a considerable saving effected in the quantity of gas consumed.

The claim is for the combination and arrangement of parts in the construction of gas-stoves, as hereinbefore set forth, or any mere modification thereof.

APPLICATIONS FOR LETTERS PATENT.

1365.—George Glover, of 8, Queen Square, Westminster, for "*Improvements in gas-meters and pneumatometers.*" May 31, 1861.

1366.—Paul Cameron, of Glasgow, Lanark, N.B., philosophical instrument maker, for "*Improvements in instruments for measuring, indicating, and regulating the pressure or flow of fluids.*" May 31, 1861.

1367.—Richard Laming, of Priory Road. Kilburn, Middlesex, for "*Improvements in manufacturing alkaline carbonates.*" A communication. May 31, 1861.

1382.—William Albert Shepard, of Pall Mall, Middlesex, for "*Improvements in obtaining products from coal, and in apparatus employed therein.*" June 1, 1861.

1397.—Alexander Prince, of Patent Office, 4, Trafalgar Square, Charing Cross, Middlesex, for "*Improvements in the manufacture of gas, and in apparatus connected therewith.*" A communication. June 4, 1861.

1414.—Edmund Smith, of Hamburg, gas-meter manufacturer, for "*Improvements in wet gas-meters.*" June 5, 1861.

1419.—John Bailey and William Henry Bailey, of Albion Works, Salford, Manchester, Lancaster, turret-clockmakers, for "*Improvements in apparatus for indicating the speed, flow, pressure, and vacuum of liquids, fluids, and other bodies.*" June 6, 1861.

1446.—Samuel Bennett the younger, of Handsworth, Stafford, coke, coal, and iron dealer, for "*An improvement or improvements in utilizing waste or defective pieces of tubing made of iron, or of other metal or metallic alloy.*" June 7, 1861.

1448.—Alexander Angus Croll, of Coleman Street, London, engineer, for "*Improvements in the manufacture of sulphate of alumina.*" June 7, 1861.

1453.—John Farrand Clarke, of 26, Moorgate Street, London, gas and steam engineer, for "*Improvements in apparatus for regulating the supply of fluids.*" June 7, 1861.

1497.—Charles Chalmers, of Edinburgh, Midlothian, N.B., gentleman, for "*Improvements in gas-stoves.*" June 11, 1861.

GRANTS OF PROVISIONAL PROTECTION.

1314.—Charles Batty, of 196, Marylebone Road, Middlesex, atmospheric engineer, for "*Improvements in the mode of, and apparatus for, warming and ventilating rooms and buildings.*" May 24, 1861.

1343.—Comyn Ching, of Castle Street, Long Acre, Middlesex, gas engineer, for "*Improvements in gas chandeliers.*" May 29, 1861.

1344.—Thomas Hale, of 21, Barnsbury Row, Park Road, Islington, Middlesex, gentleman, and Arthur Wall, of 12, Canton Street, East India Road, in the same county, gentleman, for "*Improvements in the construction and internal arrangement of furnaces, and in the preparation, manufacture, and treatment of clays, and of articles, surfaces, structures, and erections, subject to the action of fire or atmospheric influence.*" May 29, 1861.

1350.—John Henry Johnson, of 47, Lincoln's Inn Fields, Middlesex, and of 166, Buchanan Street, Glasgow, N.B., gentleman, for "*Improvements in apparatus for regulating the pressure of gas.*" A communication. May 30, 1861.

1365.—George Glover, of 8, Queen Square, Westminster, for "*Improvements in gas-meters and pneumatometers.*" May 31, 1861.

1366.—Paul Cameron, of Glasgow, Lanark, N.B., philosophical instrument maker, for "*Improvements in instruments for measuring, indicating, and regulating the pressure or flow of fluids.*" May 31, 1861.

1414.—Edmund Smith, of Hamburg, gas-meter manufacturer, for "*Improvements in wet gas-meters.*" June 5, 1861.

NOTICES TO PROCEED.

221.—Herbert William Hart, of 3, Rue Bergère, Paris, France, gas engineer, for "*Improvements in gas-burners.*" Jan. 28, 1861.

437.—Charles Maschwitz the younger, of Birmingham, Warwick, merchant, for "*A new or improved tap or stop-cock for liquids, steam, and gas.*" A communication. Feb. 21, 1861.

Parliamentary Intelligence.

HOUSE OF LORDS.

June 3, 1861.

The Lord Chancellor informed the House, that no further Standing Orders were applicable to the Darlington Local Board of Health Bill.

The Huddersfield Gas Bill was returned from the Commons, with the amendments agreed to.

June 4.

A petition was presented against the Elland Gas Bill, from persons signing, being a majority of the local board of health for the district of Elland.

The Dublin Corporation Water Bill was brought from the Commons, read a first time, and referred to the Examiners.

The Isle of Wight Water Bill was returned from the Commons, agreed to.

June 6.

A petition was presented against the Dublin Corporation Water Bill, from Daniel Tighe.

The Stockport District Water Bill was brought from the Commons, read a first time, and referred to the Examiners.

The Burton-upon-Trent Water Bill was reported, with amendments.

June 7.

A petition was presented against the Dublin Corporation Water Bill, from the Midland Great Western Railway of Ireland Company.

The Haslingden Union Gas, the Swansea Gas, the Neath Water, the Northampton Water, the Ryde Water, the Liverpool Improvement, the Uxbridge Gas, the Huddersfield Gas, and the Isle of Wight Water Bills, received the Royal assent.

The Kingstown Water Bill was brought from the Commons, read a first time, and referred to the Examiners.

The Sowerby Bridge Gas Bill was read a third time, with the amendments, passed, and sent to the Commons.

The Elland Gas Bill was reported from the select committee, without amendment.

June 10.

Petitions were presented against the Dublin Corporation Water Bill, from the Rathmines Improvement Commissioners, the Right Hon. the Earl of Meath, the Royal Dublin Society, and owners of property and ratepayers of Dublin.

The Kingstown Improvement Bill was brought from the Commons, read a first time, and referred to the Examiners.

The Darlington Local Board of Health Bill was read a second time, and committed.

The Burton-upon-Trent Water Bill was read a third time, with the amendments, passed, and sent to the Commons.

June 11.

A petition was presented against the Dublin Corporation Water Bill, from Francis Synge, of Glanmore Castle, in the co. of Wicklow, Esq., J.P., and Deputy-Lieutenant for that county.

The Darlington Local Board of Health Bill was reported, without amendment.

The Middleton and Tonge Improvement Bill was reported, with amendments.

The Elland Gas Bill was read a third time, and passed.

June 12.

The Elland Gas Bill received the Royal assent.

June 13.

Petitions were presented against the Dublin Corporation Water Bill, from the Grand Canal Company, the occupiers of houses and owners of property in Dublin, C. J. Tottenham, F. H. Henry, David Mahoney, and Henry Brett; also, against the Stockport District Water Bill, from William Davenport Davenport, the Stockport Water-Works, Charles Bostock, John Bostock, William Jowett, and John Fernihough.

The Lord Chancellor informed the House, that the Standing Orders applicable to the Dublin Corporation Water, and the Kingstown Water Bills, have been complied with.

The Bolton Corporation Bill was brought from the Commons, read a first time, and referred to the Examiners.

June 14.

A petition was presented against the Bolton Corporation Bill, from the Bolton Gas Company.

The Middleton and Tonge Improvement Bill was read a third time, with the amendments, passed, and sent to the Commons.

The Dewsbury and Batley Gas Bill was returned from the Commons, agreed to, with amendments. The said amendments were considered, and agreed to.

The Sowerby Bridge Gas Bill was returned from the Commons, with the amendments agreed to.

HOUSE OF COMMONS.

June 3, 1861.

The South Essex Water Bill. A report from the select committee on Standing Orders was read, and the Bill ordered to be read a second time.

The Isle of Wight Water, and the Dublin Corporation Water Bills, were read a third time, and passed.

The Kingstown Water Bill, as amended, was considered, and ordered to be read a third time.

The Victoria Docks Gas, the Weston-super-Mare Gas, and the Whitworth Vale Gas Bills, were read a second time, and committed.

A message was received from the Lords, intimating that they had agreed to the amendments to the Uxbridge Gas Bill.

Petitions were presented against the Wigan Gas, Meter, and Fitting Bill, from the ratepayers of Ince-in-Mackerfield, the ratepayers of Aspull, and the ratepayers of Standish-with-Langtree.

June 4.

The Staffordshire Potteries Water Bill was read a second time, and committed.

Two petitions were presented against the Highways Bill.

The Hastings Western Water (No. 2), the Fylde Water, the Grand Junction Water, the Wolverhampton New Water, and the Blackburn Water Bills, were referred to a select committee, consisting of Mr. Rich (chairman), Mr. Tomline, Colonel Maxwell, Sir Thomas Burke, and Mr. Vivian, who will sit on Friday, June 14, at twelve o'clock.

The Portsea Gas, and the Wigan Gas, Meter, and Fitting Bills, were referred to a select committee, consisting of Mr. Buller (chairman), Mr. Robartes, Mr. Hanbury, Mr. H. Sheridan, and Mr. Foljambe, who will sit on Friday, June 14, at twelve o'clock.

June 5.

The Dewsbury and Batley Gas Bill was reported, with amendments.

The Stockport District Water Bill was read a third time, and passed.

June 6.

The Kingstown Water Bill was read a third time, and passed.

A petition was presented against the Parochial Assessments Bill.

The Highways Bill was read a second time, and committed.

The Leigh District Gas Bill was referred to a select committee, consisting of the Chairman of Ways and Means, Mr. Gregson, and Mr. Charles Forster, who will sit on Tuesday, June 11, at two o'clock.

June 7.

The Kingstown Improvement Bill was read a third time, and passed.

The Bolton Corporation Bill, as amended, was considered, amendments made, and the Bill ordered to be read a third time.

The Sale of Gas Act.—A petition was presented from the Louth Gas Company, praying for inquiry into the working thereof.

JUNE 10.

The DEWSBURY AND BATLEY GAS Bill, as amended, was considered, and ordered to be read a third time.

The HASTINGS WESTERN WATER (No. 2) Bill. The order that the Bill be committed was read and discharged, and the bill withdrawn.

A petition was presented against the PAROCHIAL ASSESSMENTS Bill; also, one against the VICTORIA DOCKS GAS Bill, from the Conservators of the river Thames.

The BIRMINGHAM IMPROVEMENT Bill was reported.

JUNE 11.

The LEIGH DISTRICT GAS Bill was reported, with amendments.

The BOLTON CORPORATION Bill (New Title) was read a third time, and passed.

JUNE 12.

The WHITWORTH VALE GAS Bill was referred to a select committee, consisting of the Chairman of Ways and Means, Mr. Charles Forster, and Mr. Gregson, who will sit on Monday, June 17, at two o'clock.

JUNE 13.

The DEWSBURY AND BATLEY GAS Bill was read a third time, and passed, with amendments.

The SALE OF GAS ACT.—A return was presented of a copy of all reports made since February, 1860, relative to steps which have been taken for giving effect to the Sale of Gas Act.

JUNE 14.

The PORTSEA GAS Bill was reported, with amendments.

The Lords amendments to the BURTON-UPON-TRENT WATER Bill were agreed to.

HOUSE OF LORDS.

(*Before the Duke of* MANCHESTER, *Chairman; the Earl of* CAWDOR, *Viscount* LIFFORD, *Lord* WALSINGHAM, *and Lord* RIVERS.)

SOWERBY BRIDGE GAS BILL.

THURSDAY, MAY 30.

Mr. H. RODWELL, and Mr. J. CLERK appeared on behalf of the promoters, and Serjeant WRANGHAM, Mr. HOPE SCOTT, and Mr. MEREWETHER for the oppositionists.

After a long conversation between counsel and agents on both sides,

Mr. RODWELL said that in this case he appeared for the Sowerby Bridge Gas Company, and that counsel had been talking the matter over, and had almost agreed. There were some details as to the phraseology of the principle of the Act upon which they had very nearly agreed, though they had not exactly as yet come to a settlement. He proposed that they should adjourn until the following morning, when they would dispose of the case, he had no doubt, very shortly. There were some technical words in dispute, and the difficulty was to frame a clause upon the instant; but, if they adjourned, all difficulties would be arranged, and they would give their lordships very little trouble.

Serjeant WRANGHAM said that he appeared on behalf of the Lancashire and Yorkshire Railway Company, and that they would proceed in their opposition to the bill unless there was a clause satisfactory to them introduced into the measure. That clause had not yet been settled, and the terms of it would have to be discussed. The bill was an opposed bill still; in fact, until the clause was agreed upon, it could not be said to be an unopposed bill.

Mr. RODWELL said that, if he were to enter into the provisions of the bill at once, he should only be occupying their lordships time needlessly, because he believed that counsel on both sides would be able very quickly to agree upon a clause that would satisfy both parties. He was prepared to go on with the bill, and to open the case on the part of the promoters at once; but, if he were to occupy their lordships time needlessly, they would very naturally find fault with him.

The DUKE OF MANCHESTER said that, under the circumstances, they would adjourn the inquiry until the following day.

FRIDAY, MAY 31.

On the reassembling of the committee this morning,

Serjeant WRANGHAM said that the parties had come so far to an agreement that he should not oppose the preamble of the bill. Amendments in other parts of the measure were necessary; but, so far as the preamble was concerned, he would offer no opposition to it.

Mr. RODWELL said that this was a bill for incorporating the Sowerby Bridge Gas Company; for enabling the company to raise further capital; for better supplying Sowerby Bridge, and the neighbourhood thereof, with gas; and for authorizing the sale of the undertaking of that company, and also of the rights and powers of the Sowerby Bridge Gas Consumers Company (Limited); and for other purposes. His course was very much relieved by the fact that his learned friend would not oppose the preamble, but would merely seek for some alteration in the clauses. The facts were these—two bills had been introduced into the House of Commons, one by the old and the other by the new consumers company, and both had been consolidated into the one now on their lordships table. The two bills were opposed, and the two companies had been brought into competition with each other; but they were now satisfied to make an arrangement. The only opposers at present were the Lancashire and Yorkshire Railway Company; and the object of their opposition was to satisfy themselves as to the course the gas companies intended to pursue with regard to the supplying of their company with gas. The new company had agreed to supply them; and the only question now was, as to how far the Lancashire and Yorkshire Railway Company were determined on having the arrangement with the old company carried out? He hoped those differences would be settled, because they were in reality the only points in dispute. He would prove the preamble by the evidence of a witness. That preamble was to the effect that the present supply of gas was quite insufficient for the town and neighbourhood; that the population was rapidly increasing; and that the present company were inadequate to afford the supply without having additional capital. In the various clauses, provisions were proposed which had reference to the rate at which the gas was to be supplied. He felt that, under the circumstances, he would not be justified in occupying their lordships at any greater length. He would call Mr. Norris, who would give them every information as to the preamble, after which they would hear his learned friend's suggestions as to how they were to deal with the Lancashire and Yorkshire Railway Company.

Henry Alexander Norris, Esq., examined by Mr. CLERK.

I am the honorary secretary, and one of the managing directors of the Sowerby Gas Company. That company was established in 1834, to supply the town of Sowerby with gas, and since that they have been supplying it. There were considerable complaints in 1858 and 1859 as to the supply of the town gas. There were two schemes before the other House for that supply. One was by the old company, and the other was by the new company. It was arranged before the Lower House that the local board should purchase our works, and buy out our interest. The new competing company had not established any works at that time, but they were seeking for powers to establish works. We were taking powers to increase our works. The local board were to purchase the whole of our works by an agreement. That agreement was set out in the schedule of the present Act. That agreement with the local board had been confirmed by the ratepayers of the district of Sowerby Bridge, at a meeting called for the purpose. The second schedule contained an agreement with the Consumers Company, for the purchase of their rights. There was a meeting at Sowerby to confirm that agreement also.

Cross-examined by Serjeant WRANGHAM: The Lancashire and Yorkshire Railway runs through Sowerby Bridge.

Mr. RODWELL said that this constituted the proof of the preamble.

Serjeant WRANGHAM stated that there was no objection to any of the clauses down to clause 48. But, in that clause, page 20, the promoters said that, "It should be lawful for the company or the directors, from time to time, to enter into and make any contract or agreement with the surveyors, or other person or persons, or company having the control, direction, or management of any street, bridge, or railway within the limits of this Act, for lighting and supplying the same or any part thereof with gas, or for providing the same with lamp-pillars and posts, lamp-brackets, lamps, and glass, and for the repairs thereof respectively, and also from time to time to make and enter into any contract or agreement with any body corporate, railway company, surveyors, or person, for lighting or supplying with gas any church, chapel, shop, inn, tavern, dwelling-house, mill, manufactory, warehouse, station, or other public or private building, in such manner, under such conditions, and upon such terms as shall be agreed upon between the company and such body corporate, company, surveyors, or other person respectively." He proposed to amend part of this clause by making it embrace the Yorkshire and Lancashire Railway Company.

Mr. RODWELL saw no objection to supply the railway company; but thought the promoters ought not to have their powers limited with regard to the extent to which they might supply other companies. There was no other company certainly in the neighbourhood of Sowerby Bridge, except the London and North Western; but that was a few miles distant. Still, the power to supply other companies should be retained in the clause. If his learned friend would strike out the "Lancashire and Yorkshire Railway," and put in "railway companies generally," there would be no objection so to frame the clause. All he required was, that the gas company should have the privilege of extending their supply to any other railway companies which might come into operation at Sowerby Bridge.

Serjeant WRANGHAM said that, if this were the only objection, he would yield to it at once, because he did not care anything in the world whether the promoters supplied any other railway company, or not. Therefore, he would alter the clause, and, instead of saying "Lancashire and Yorkshire Railway Company," he would put in "railway companies generally."

The room was then cleared. On the re-admission of the public,

The CHAIRMAN said that the committee had agreed to pass the bill, with the amendments proposed and agreed to by the learned counsel on both sides

(*Before Lord* LYVEDEN, *Chairman, Earl* AMHERST, *Lord* ABERCROMBY' *Lord* HARRIS, *and Lord* TREDEGAR.)

ELLAND GAS BILL.

THURSDAY, JUNE 6.

Mr. MEREWETHER, Q.C., and Mr. J. CLERK, appeared for the promoters; and Serjeant WHEELER, and Mr. PHILBRICK, for the occupiers and owners of property and consumers of gas in the township of Elland-cum-Greetland, in the parish of Halifax, petitioners against the bill.

Mr. MEREWETHER, in opening the case, said he had the honour to appear with his learned friend, Mr. Clerk, in support of the bill, the object of which was for supplying with gas the township of Elland-cum-Greetland and adjacent places in the parish of Halifax in the West Riding of the county of York, and for other purposes. The subject for their lordships consideration was a very simple one, and would not occupy much of their time. Those for whom he appeared, like many others in the early history of gas-making, established themselves as a private company, and for a considerable number of years conducted their operations in that capacity. But, recent decisions of the courts of law had settled the point that unincorporated gas companies had no power to break up the public streets for the purpose of laying down their pipes, and this, with other causes to which presently he should have to advert, had rendered it necessary for his clients to come to Parliament to ask for the requisite powers to conduct their affairs without interruption. This company were established by a deed of settlement in the year 1836, and they proceeded to erect gas-works for the supply of Elland and the places adjacent. They raised among themselves a capital of £4000, divided into 400 shares of £10 each; and their deed provided that they might borrow, on security of the property of the company, or by the creation of new shares, such further sums of money as might be found necessary to carry out their undertaking. In pursuance of such power, they subsequently increased their capital by the creation of 100 new shares of £10 each, upon 80 of which shares the full sum of £10 each was paid, and upon the remaining 20, which were forfeited and sold by auction, the sum of £114. 17s. 6d. was realized by the company. They had also, in further pursuance of the same power, created and issued 227 new shares of £10 each, upon which £6 per share had been paid; and they afterwards repurchased 28 shares in their undertaking, and merged the same, leaving the present number of shares 699 of £10 each, upon all which dividends of equal amount had been from time to time paid without preference or priority. The company had also borrowed, on mortgage of their lands, buildings, works, and premises, the sum of £1200, which they expended in the enlargement of their works, which sum of £1200 still existed as a charge on the estate. The preamble of the bill recited that the company had expended upon their works the sum of £10,000 and upwards, including the sum of £1200 so borrowed, as before mentioned. The various amounts, which he had already stated as raised by the company, would not make up a total of £10,000, but the recital of the preamble was nevertheless true, for the company had done what was by no means an uncommon thing in such cases—they had gone on increasing the value of their property, and extending accommodation to the public by expending a part of the profits of their undertaking which they might have divided amongst themselves upon

extensions of the concern. They were in a position to show that, beside the share capital actually raised, a considerable sum out of their annual profits had been so invested in the undertaking, instead of issuing new shares as the necessity for fresh outlays arose. The preamble of the bill then went on to state that the population and house property of Elland, Elland-cum-Greetland, Stainland, Stainland with Old Lindley, Southowram, Fixby, and Skircoat, and the neighbourhood thereof, had of late years greatly increased, and was still increasing; that mills, manufactories, dye-works, and other works, had been erected, and were in course of erection therein; and that it would be of public advantage, if provisions were made for the efficient lighting of those places with gas within the limits defined in the bill, and if the capital of the company was increased, and the requisite powers were conferred upon them for that purpose. Elland was one of those places of which there were many in the north of England, where large populations had been gathered together of late years, and extensive factories had sprung up, and to which a supply of gas was of essential importance. These works, like many others, were established for the supply of a few people, but, by the rapid increase of population in the district, it had become necessarily enlarged to meet the growing demands made upon them, and he thought the proposition contained in the bill would very readily meet their lordships sanction. Lord Redesdale had stated his view of how the capital of the company should be dealt with in the 16th section, which provided that the capital should be £28,000, divided into 2800 shares of the nominal value of £10 each; and in the 17th section arrangements were made, also under his lordship's authority, for the appropriation of those shares. The clause stated that 699 of the said 2800 shares shall be allotted to the proprietors of shares in the company at the time of passing this Act, in proportion to their several interests in the same, and shall be deemed to be paid-up ordinary shares in the company by this Act incorporated; and 699 other of the said 2800 shares shall be in like proportion allotted to the proprietors aforesaid; but such last-mentioned shares shall be deemed to be paid-up preference shares, and shall be entitled in priority to a fixed preferential dividend of 4s per share per annum from and out of the profits of the undertaking. There was only one other matter which he had to state with regard to the bill itself, and that was as to the amount of the future capital of the company. The necessity for the proposed increase was obvious. The company had found their works inadequate, and had already had to extend them. To meet the further demands which the increase in the district would make upon them, still further extensions would be necessary. The amount which they proposed to take was a very moderate one; and it was somewhat surprising that any one should come forward to oppose it. The bill had already passed the other House of Parliament, and he was happy to say that only one petition had been lodged against it in their lordships House. That was a petition of certain owners and occupiers of property and consumers of gas in the township of Elland-cum-Greetland. The petitioners stated that they were large consumers of gas, and that they petitioned the House of Commons against this bill; but, by reason of some error in the time of presenting that petition, they could not be heard, although they had counsel and witnesses in attendance. Now, he ventured particularly to call the attention of the committee to this allegation, because, although he did not intend to object to the presence of the petitioners here, he thought the promoters had good reason to complain about their conduct in this respect. It was quite true that, on the preamble of the bill, they were not permitted to be heard in the House of Commons; but, after the preamble had passed, the professional gentleman who represented them took part in the discussion upon the clauses, and alterations were made therein at his suggestion. The noble chairman, from his recollection of the course of proceedings in the other House, would agree with him that the promoters of the bill might, under the circumstances stated, have objected to the petitioners taking any part in the discussion of these clauses. The truth was, that Sir John Hanmer, the chairman of that committee, said, as they were there, and could give some information which would probably have the effect of saving trouble elsewhere, the committee would listen to their suggestions, and accordingly they were heard.

Serjeant WHEELER said he did not know whether he should be in order in answering his learned friend at that stage of the proceedings, but, upon a question of fact, he should be sorry if any misapprehension was created. He relied not only upon his own recollection of what took place, but he had the short-hand writer's notes to refer to. He himself was excluded from appearing before the committee of the House of Commons upon the objection taken by the promoters, and the attorney who instructed him was heard upon some parts of the bill, not for the consumers, but as representing the corporation of Halifax.

Mr. MEREWETHER said he had already stated, that the parties now petitioning were not heard upon the preamble, but that during the discussion of the clauses, the gentlemen who represented them took part. It was not on behalf of the corporation of Halifax that he did so, but in the interest of the consumers, and at his suggestion the maximum price of gas per 1000 was reduced from 5s. 6d. to 5s., the illuminating power was increased from 12 to 14 candles, and the testing of the gas by the private consumers was conceded. It was true that, in the petition before their lordships, they stated other grounds of objection to the bill, but what he complained of as unhandsome was, that having gained the points he had named in the other House, they should come here and allege that they had not had the opportunity of being heard. The petition stated that, though the bill was amended in some particulars in the House of Commons, yet its provisions as they now stood were in many respects improper and insufficient, and they believed that had they been represented, those provisions would not have been sanctioned. The petitioners then alleged four objections to the bill—First, that the limits of the proposed supply were improper. Second, that the maximum price was too high. Third, that the regulation of the company's capital was disadvantageous to the public, and conferred excessive benefits upon the promoters, and fourth, that the bill made no provisions for the transfer of the company's works to any public body. The committee would find that the limits of the bill were limits which had been taken by the promoters, not simply for their own purpose, but with a regard also to the advantage of the neighbourhood. It was a remarkable inconsistency in the petition, that the company were charged with attempting to supply a thinly-populated part of the district. Now, if they had regarded only their own interests, a thinly-populated district was not one that they would have sought. But the company felt that they had to do their duty to the consumers, and it would be a just ground of complaint against them if they had picked out all the plums, and left the rest uncared-for. The district consisted largely of mills, many of which stood alone, but they equally required a supply of gas as though they were all immediately adjacent, and he thought he should be in a position not only to justify, but to take credit for the course which the company had adopted in reference to them. As to the maximum price for gas permitted by the bill, the committee would find that, as compared with other places in the same locality, it was below the average. In reference to the regulation of the company's capital, the petitioners did not specify the grounds of their objection, and his answer to the general allegation was that the regulation had been made in accordance with the arrangements of their lordships House. As to the fourth allegation, the promoters had fair ground for complaint. When they were preparing to come to Parliament, they made arrangements for the transfer of their works to the local board of health, and sent a copy of the bill with provisions, to that effect inserted, to them. The local board, however, adopting the parliamentary form of dismissing a proposition, resolved "that the further consideration of the subject be adjourned for six months." The gentlemen who now came forward as petitioners, some of them being members of the local board, would have to vindicate their consistency on this point, and certainly the promoters would stand very securely before their lordships, freed from any blame in the matter. The complaint as to the price of gas was based by the petitioners upon a comparison with other places; and they stated that the charge at Halifax was 4s.; at Huddersfield, 4s.; at Sowerby Bridge, 4s. 2d. to 5s.; and at Brighouse, 4s. 2d. The committee would easily understand that, where the consumers of gas were closely packed within a district, the company could afford to supply at a lower rate than they could in a thickly-populated, and scattered district, where the mains extended for a great distance without supplying a single customer. He ventured to say that the objection in the petition was rather a captious one, and that they would not be able to sustain it. They then stated that, in pointing out these objections, they did not intend to confine themselves to those four heads; that they had only noticed some of the most salient points. It would, therefore, appear that, if they were to have their way, the committee would find that they had some reserved grounds of battle. There was nothing else in the petition, except that they stated the preamble did not support the bill.

The CHAIRMAN: What is the prayer of the petition?

Mr. MEREWETHER said it was against the preamble, and such parts of the bill as prejudicially affected their rights and interests, and that the bill might not pass into law as it now stood. In fact, it was an ordinary petition; and he admitted that there were a good many signatures to it. He did not know how they meant to support their allegations; but he might state that there were many petitions in favour of the bill. In fact, it was such a bill that every one must be in favour of, except people like those who seemed to like to have a grievance. If they did not occupy too much time in stating that grievance, he, for one, should not object to their doing so; but, he hoped, they would not carry their grievance so far as to tax too much their lordships patience. In conclusion, he would merely say that it was often urged by those who opposed a bill of this kind, that the gas company ought not to be surprised at the opposition, because they had had a good thing in past times; but in the present case, the remark could not apply, inasmuch as for twelve years the proprietors in the Elland Gas Company received no dividends at all.

FRIDAY, JUNE 7.

Mr. *Joseph C. Hoatson*, examined by Mr. CLERK.

I am clerk to the Elland Gas Light and Coke Company, which was established by deed of settlement in 1836. I have been clerk to the company since 1849. The gentlemen who were my predecessors in the office are all dead, as far as I know, and the information I have to give is derived from the books of the company. The original capital of the company was £4000, with a power to raise additional money by the creation of fresh shares as might be found necessary. The first capital was raised by the creation of 400 shares of the value of £10 each. Subsequently, they issued other shares, and their present total share capital consists of 727 shares, amounting in value to £6276. 17s. 6d. Besides that, it appears from the books that, instead of dividing all their profits among the shareholders, they have expended the sum of £3586 out of them in extensions of works up to this time, and also a further sum of £1200, which has been borrowed on mortgage of the freehold and plant of the company. That £1200 is still due as a charge upon the estate. We now supply with gas not only the parish of Elland-cum-Greetland, but the adjoining townships of Stainland-cum-Lindley. For the first twelve years of their existence, the company declared no dividend. At the close of that period, they paid a dividend of 6s. per £10 share. Last year, they paid 10s. upon each share, which is the highest dividend they have ever paid.

Cross-examined by Serjeant WHEELER: Elland is in the parish of Halifax. The whole of the district we seek to supply is in that parish. Elland-cum-Greetland includes West Vale and Browbridge. They are not the most populous parts of the district, nor are they nearest to the gas-works. They are nearer to the works than some of the other townships. Elland proper is nearer than West Vale. Our works are close to the canal, so that they admit of very readily obtaining our coal, and getting rid of our products. They are about 400 yards from the railway station. I do not know of my own knowledge what is the acreage of the district within which we seek to supply gas. We supply Messrs. Shaw's mill with gas. The price charged to them is 5s. per 1000 cubic feet, subject to a discount on account of their large consumption, which reduces the charge to 3s. 4¼d. We have a special agreement with regard to that place, and should be glad to make a similar agreement with any other parties. The outlying districts are higher than Elland and West Vale.

Serjeant WHEELER: It was stated in the House of Commons that the expenditure out of profits was £3455; was that an error in the bill?

Witness: It was not; but, since the bill was submitted to the Commons, there have been some small sums added, which had been previously expended, but had not been included in the account. All that money has been laid out in extensions solely; whatever has been expended in the way of maintenance of works, has been deducted. I am acquainted with the price of gas in neighbouring places to Elland. Sowerby Bridge is three miles from us, and Rochdale about fifteen miles. I do not know where the coals used at the latter place come from. There is an abundance of coal in Lancashire. I do not know whether that or Yorkshire coal is used. If the latter, it is not necessary that it should be brought from beyond Elland, as there is coal to be had at Lowmoor. There is a local board of health at Elland. When this bill was introduced into the House of Commons, there were provisions in it for transferring the property of the gas company to that board. Those clauses were expunged, because the local board were not desirous to have them. I am aware that there was a petition to their lordships House; but I understand it was not signed by the local board at their meeting, and that it has been withdrawn. I have seen the petition of the gas consumers. It is signed by a good many consumers in Elland-cum-Greetland, but not the whole nor the most important of them. I suppose the object of it is, that they are desirous to obtain gas as cheap as they can.

Serjeant WHEELER: I see that the 17th clause of the bill relates to the apportionment of the shares when this Act was passed, and there is one pro-

vision which perhaps you can explain to me. The 16th section says—"The capital of the company shall be £28,000, and such capital shall be divided into 2800 shares, of the nominal value of £10 each." How many shares have you at present?

Witness: Six hundred and ninety-nine.

Serjeant WHEELER: The 17th section says that 699 of the said 2800 shares shall be allotted to the proprietors of shares in the company at the time of the passing of this Act, in proportion to their several interests in the same, and shall be deemed to be paid-up ordinary shares in the company. Those shares, of course, are to represent the existing shares of the company?

Witness: They are to represent a part of them.

Serjeant WHEELER: I am speaking now of the share capital, not of the money expended out of profits upon extensions. Then, "699 other of the said 2800 shares shall be in like proportion allotted to the proprietors aforesaid." Is that to represent the £3500 expended upon the works beyond the share capital?

Witness: It is to represent the difference between that amount and the amount received upon the 699 shares, which was £6276. The 699 shares of £10 each will be £6990; you have, therefore, £714 to deduct from the the £3586, which leaves £2872; and that £2872 is represented by the 699 shares to which you now refer, and is an arrangement with Lord Redesdale.

Serjeant WHEELER: Did not my Lord Redesdale say that this, being an opposed bill, he should leave the matter in the hands of the committee?

Witness: He did not express an opinion upon that part of it. I was present when Mr. Wavell was before his lordship on Monday last, but no reference was made to it.

Serjeant WHEELER: Did not his lordship say that he would give no opinion that would prejudice the inquiry before this committee?

Witness: Precisely.

Serjeant WHEELER: What I want to know is, whether the 699 shares are not to be given for the £2872?

Witness: It is so.

Serjeant WHEELER: Then, that is a bonus to the shareholders of several thousand pounds?

Witness: No; not if you take it in connexion with the dividend.

Serjeant WHEELER: What do you mean by dividend? There is to be a fixed preferential dividend of 4s. per share.

Witness: Yes; which is not more than 2 per cent.

Serjeant WHEELER: Still there is to be a preferential dividend upon an expenditure which at present bears no dividend at all. There are to be £6990 of shares, given in respect of an expenditure of between £2000 and £3000.

Witness: An expenditure of £2872. The dividends on the ordinary shares is limited by the Gas-Works Clauses Consolidation Act, which is incorporated with this Act, to 10 per cent.

Re-examined by Mr. CLERK: At present, the company are under no limitation as to the amount of their dividends. The 17th section of the bill was settled with Lord Redesdale before the bill went into the House of Commons. We had arranged our capital in a different way; the petitioners went before Lord Redesdale, and asked him to revise it; and his lordship refused to entertain their request. The maximum price for gas which was originally inserted in the bill was 5s. 6d. per 1000; and it was altered to 5s. in the House of Commons, at the instance of the solicitor and parliamentary agent of the opponents. I have looked at our books to see the quantity of gas consumed by the parties who petition against the bill. It is rather more than 3 million feet per annum. Our total annual consumption is 9½ million feet.

By Serjeant WHEELER: I cannot tell what is our annual make of gas.

By Mr. CLERK: The consumption of Messrs. Shaw, who petition in favour of the bill, is two-thirds of the quantity consumed by the whole of the petitioners against the bill. We supply them at so low a rate on account of the extent of their consumption. We give discounts to all our consumers indiscriminately, in proportion to the amount they consume.

The CHAIRMAN: You said that the agents of the opposing parties were present at the termination of the discussion in the House of Commons when the maximum price of gas was reduced from 5s. 6d. to 5s. Did they consent to the reduction—were they satisfied with it?

Witness: They were not altogether satisfied.

The CHAIRMAN: What did they seek to reduce it to?

Witness: Four shillings and sixpence per 1000.

Mr. *Joshua Waddington*, examined by Mr. CLERK.

I am chairman of the Elland Local Board of Health, and treasurer of the Elland Gas Company. When this bill was prepared, it was brought before the board; and there was a meeting called to consider what steps should be taken with regard to it, when it was resolved to adjourn the consideration for six months. At that time, there was a provision in the bill giving power to the local board to lease the works. I do not recollect whether the subject was again brought before them by the gas company. There was something with regard to petitioning against the bill brought forward. The purchasing clauses were obliged to be struck out of the bill in consequence of the local board declining to do anything in the matter. The company at present supply all such parts of Elland-cum-Greetland as require gas. It is partly a rural, and partly a manufacturing district. The manufactories are situated in the valleys at distances apart, and our mains extend from one to another. When the bill was in the House of Commons, there was a discussion, arising out of an opposition by the corporation of Halifax, to our supplying gas to the district of Salter Hebble, and a portion of Skircoats and Southowram. That was the question mainly discussed then, and it was decided that our company was most conveniently situated for the purpose. The Halifax corporation are not now opposing the bill. I heard the whole of the discussion in the House of Commons in reference to the price of gas. I am aware that the consumers were not heard upon their petition against the preamble; but, when the clauses were discussed, they made suggestions as to price, illuminating power, and the testing of the gas, and provisions were introduced into the bill to some extent to meet the views of the petitioners. The illuminating power was increased from 12 to 14 sperm candles.

Cross-examined by Serjeant WHEELER: I know all the gentlemen who petitioned the House of Commons against the bill. I saw several of them in the committee. I do not recollect that any of them were examined as witnesses.

The CHAIRMAN (to Serjeant Wheeler): You appear against the preamble here?

Serjeant WHEELER: I do.

The CHAIRMAN: The lords cannot alter the rates.

Serjeant WHEELER: Your lordships can do all that we ask, because this is not a taxing bill. This is only a question of price, and your lordship knows far better than I do that there is a distinction here. It is in the nature of a benefit received, and not of a tax imposed. Several gas bills I have been told have been introduced into the House of Lords first. The House of Commons altered their standing orders to meet a case like this. It seems to me that it is quite within the province of your lordships, because it is not a taxing power that is sought, but the regulation of a price for a benefit received, that is to say, we shall have gas for the price we pay.

The CHAIRMAN: Does not price come within the rule?

Serjeant WHEELER: I think it does not.

Mr. *Charles Child*, examined by Mr. CLERK.

I am an architect and land-surveyor in Halifax, and have been for many years engaged in that profession, and was agent to the Earl of Scarborough, who is a large landed proprietor in that district. I coloured the maps now before the committee. I have ascertained the number of yards of pipes which the company have in this district. The total mileage of mains is about 9¼. The total area of the district sought to be supplied with gas is 7200 acres. At the present time, the company supply Elland and Stainland. The acreage of Elland is 3448 acres, and the whole of that is included in their district. They also supply 2335 acres in Stainland. Fixby is not supplied at present, but the company's mains go close up to the township, and they seek to supply 934 acres there. There is a small portion of Skircoats included in their proposed district—about 146 acres; and also 337 acres in Southowran; making a total of 7200 acres as against 5783 acres at present supplied by them. The works are well situated for lighting all this district, as they are at a low level. Salter Hebble can be better supplied from Elland than from anywhere else, as it is at a very low level as compared with Halifax. The extent of addition proposed to be made to the company's district is 1417 acres, of which 146 acres are in Salter Hebble. The part sought to be supplied consists of villages at a distance from each other; and there are mills scattered over the district. The company have mains running to all those different districts, except Fixby. I do not know the length of mains in places where there are no consumers.

Cross-examined by Serjeant WHEELER: There are a good many mills at Browbridge. It is an extending place, and the company's mains pass through it to get to Stainland.

Mr. *Joseph Beaumont*, examined by Mr. CLERK.

I am one of the overseers of the poor of the parish of Elland-cum-Greetland. I have examined the petition presented to this House. The total number of signatures to it is 367. The total rateable value of property in the township is £22,133, and the rateable value of the property of the petitioners is £3932. The total number of ratepayers is 1894. I have examined the books of the company, to see how many of the 367 petitioners are consumers of gas, and I find there are 84.

Mr. *Hoatson* was recalled, and, in answer to Serjeant WHEELER, said the total number of consumers of gas in Elland is 321, of whom 84 are petitioners against the bill.

Thomas Hawksley, Esq., examined by Mr. CLERK.

In the month of March last, I was requested to make an inspection of the company's works at Elland. I then made a careful examination of the works and of the district. The works consist of 35 retorts and the usual apparatus for condensing and purifying. There are 10 retorts now in course of erection in addition to the 35. The present manufacturing capacity of the works is about 140,000 cubic feet per day, and the present maximum demand is 113,000 feet. The district is one that is increasing. It is a very remarkable district to supply; there is a river flowing in a deep valley with hills rising on every side, which are very steep. There are a great many mills; they are very scattered and at different levels, the population around them being, as usual, very small. I should think the difference in the levels is as much as 400 feet. Stainland, which is a considerable place and an important part of the district, as far as the supply of gas is concerned, must be 460 feet above the gas-works. This difference increases the cost of supply beyond what it would be if the district were more level and the population more closely congregated together. There is a considerable loss by leakage, owing to the disproportionate length of pipes and the disproportion of pressure, which cannot be avoided in such a district. These are evils which the company cannot avoid, unless they abandoned some of the most profitable parts, and, in a public point of view, the most important parts. In Elland, they supply only 1½ million cubic feet of gas per annum for every mile of pipe, whereas in Huddersfield and other places, the supply is 4 million feet per mile per annum. If this company were limited as to their district, that would increase the cost, and the mills and places furthest from the gas-works would be practically cut off from a supply of gas. The works are well situated in reference to the supply of the whole district; they are close to the river; they immediately adjoin the canal, and are alongside the railway at a low point. There is no large population immediately around, which is also another advantage. They have 1¼ acre of ground around them applicable to any extensions required, but which is more than necessary for any such purpose. The present population of the district within the limits of the bill, is about 16,000, and it is rapidly increasing. I have not ascertained how much it has increased of late years. I inspected the works to see what their present value was. I estimated it at £10,500, and the company would require about £700 or £800 in addition, as floating capital, to carry on the undertaking. I am aware how the capital is proposed to be fixed in the bill. That fairly represents the capital expended upon the works; taking the limited amount of interest, it rather underrates it, for it only represents £8340 at 10 per cent. The clause, suggested by Lord Redesdale, takes the shares at a mere nominal value, and not at their real value; that is, the preferential shares, to which 4s. per annum is attached. Of course, it is perfectly immaterial, as far as the company are concerned, whether they are taken at that or any other nominal value. I do not consider that represents the amount of money expended by the company, because, as I said, it only represents £8340, whereas they have certainly invested £11,000 in the works. It makes it that the maximum dividend the company can receive under this arrangement is as nearly as possible 7½ per cent. I am aware that the capital is to be fixed at £28,000. It is necessary it should be so, for it then only leaves £14,000 for future extensions, and I do not believe that sum will last them for ten years, so that they will have to come to Parliament again, which is a very great expense, especially for a small company. The usual rule is to take as much capital as will be necessary for twenty years. I have seen the petition against the bill. I think the limits of the district are properly fixed, and that the maximum price of gas, 5s. per 1000, is very moderate, taking into account the physical and commercial conditions of the company. I am familiar with the prices of gas in neighbouring places; keeping those prices in view, I consider 5s. per 1000 at Elland is reasonable, especially remembering that coals are now steadily and gradually rising in cost all over the kingdom.

The CHAIRMAN: What is the highest maximum you have known?

Witness: I have known it as high as 7s. or 7s. 6d.

By Mr. CLERK: There are many companies, at the present moment, with a maximum of 6s. The illuminating power of the company's gas was raised in the House of Commons from 12 to 14 candles, which is a very high standard for that district. It adds 7d. per 1000 feet to the cost of manufacture. It adds about 4d. directly, and 3d. indirectly, in this way: that, as you increase the illuminating power you diminish the consumption, and, therefore, you have to divide the gross profits by a smaller divisor. That is the case everywhere. At Halifax, the illuminating power of gas is fixed by their Act of 1854 at 12 wax candles, which is equal only to 10 sperm. The illuminating power of gas must, in point of fact, always be greater than that prescribed by the Act, to the extent of from 2 to 3 candles. If it were not so, in particular states of the weather—for instance, during frost—the gas would be below the standard, and the company would fall under the penal clauses of the Act; so that the public always get something more than the illuminating power fixed by Parliament. In order to get 14-candle gas, the manufacturer must keep up the quality to 16 candles. The maximum in this bill, as fixed by the House of Commons, is 14 sperm candles.

The CHAIRMAN: Then, the House of Commons increased the illuminating power, and reduced the price?

Witness: Yes.

Serjeant WHEELER said he did not intend to cross-examine the witness.

Thomas G. Barlow, Esq., examined by Mr. CLERK.

I inspected the works of the Elland Gas Company in March last. My estimate of the value of those works is a little higher than Mr. Hawksley's. I value them at £10,778, and to that I add £700 for floating capital—making £11,478. I consider that the arrangement of the capital, as proposed by the bill, is very favourable to the consumers of gas—indeed, it is a little harsh towards the company. I quite concur with Mr. Hawksley that it leaves them with a maximum dividend of about 7½ per cent. upon what they have spent.

The CHAIRMAN: It is scarcely worth while to accumulate evidence upon points to which the petitioners do not object.

Serjeant WHEELER: Although I did not cross-examine the last witness, it must not be presumed that I take all that he stated for granted.

Mr. CLERK: You see, my lord, I could not tell whether my friend would not call witnesses to say that gas could be supplied at 2s. per 1000.

Examination continued: I am acquainted with the district proposed to be supplied. I think the price of gas fixed by this bill is very low, and the illuminating power very high. The company cannot manufacture 14-candle gas from the coal of that district; they will have to get cannel from some pits near Leeds. The illuminating power in the Sowerby Bridge bill, now passing through this House, is 12 sperm candles.

Cross-examined by Serjeant WHEELER: The Sowerby Bridge bill is promoted by the local board. I was concerned in the Huddersfield bill, where the illuminating power is fixed at 14 candles. The price there is 4s. in the borough, and 5s. beyond.

Re-examined by Mr. CLERK: The consumption of Huddersfield is nearly 4 million feet per mile of pipe per annum; and, in the Elland district, it is about 1¼ million. If the Elland Company had the same consumption per mile as the Huddersfield Company, they could afford to supply as cheaply.

Mr. CLERK: That is my case.

Serjeant WHEELER said he thought, under the circumstances, he ought to begin by stating exactly the position in which he conceived the petitioners for whom he had the honour to appear, stood before this committee. And, in order that there might be no mistake on that point, the original minutes of what took place in the House of Commons having been referred to their lordships, he would take the liberty of reading one short passage from them, which would bring the real facts before the committee. Mr. Newall applied on behalf of the consumers of Elland to appear and oppose the bill, on the ground that, owing to a misconception on the part of the petitioners, no petition had been entered on which to appear. Mr. Sudlow objected to any appearance before the committee on the ground of irregularity. The committee-room was cleared, and the counsel and agents having been called in, the chairman said the committee had considered the question submitted to them, and they were unanimously of opinion that they could not interfere to permit the appearance to be entered. Their lordships would, therefore, see that all the grievances of the petitioners were unrepresented before the committee of the House of Commons, or at all events they were not represented in the way in which the petitioners desired them, viz., by the counsel and witnesses who were in the room for the purpose of being called. He thought it was somewhat hard upon these parties that their opposition should be sought to be prejudiced in this committee, by referring to what occurred in the House of Commons. But beyond this, he felt persuaded he should be able to show their lordships that they had a very substantial case indeed to place before the committee, and one that involved in a very important way the interests of the parties for whom he appeared. He need not tell their lordships that in those busy hives of industry of Lancashire and Yorkshire, where, for manufacturing purposes, gas was an essential ingredient in the annual expenditure of an establishment, it was of the utmost importance that it should be supplied on the most reasonable and economical terms, so that the manufacturers in those districts might be able fairly to enter into competition with persons in other districts manufacturing the same products. They all knew, as a matter of fact, that when advantages were pretty nearly balanced, the slightest possible difference, one way or another, in establishment charges might make all the difference between the successful or unprofitable working of a business. The gentlemen on whose behalf he appeared had felt the greatest possible desire that, while the promoters of this bill were seeking a monopoly (he did not use the term in any offensive sense), and that which, in point of fact, would give them a parliamentary *status* in all time to come, and convert their undertaking into something very fixed and certain as far as its advantages were concerned, those advantages and interests should be guarded and hemmed in, and hedged about for the benefit of those who in future must be entirely dependent upon this company for their supply of gas. Mr. Merewether, in opening this case, spoke of the petition before the committee; and admitted that it had received the signature of a large number of persons. He (Serjeant Wheeler) had now that petition in his hands; and, he thought, he might safely say that there never was a petition placed on the table of their lordship's House which presented more conclusive evidence of *bonâ fides* than this one. The parties who had signed it not only attached their names but their residences, and their particular avocations, and, therefore, there were all the means of knowing that this was not a fishing or speculative petition, but the representation of what the petitioners felt would be to them a most serious grievance if the bill in its present shape should pass into law. Some reference had been made to the board of health of Elland, and to the fact, which the petitioners certainly did not look upon with any favour, but with considerable regret, that there should have been expunged from this bill those powers which it originally contained for the transfer of the gas-works to that board. The board of health, in a district like Elland, might be said to be a *quasi* corporation; and it was of the utmost advantage and importance to the community that the gas-works should be in the hands of some one or other representing the public. It had been said that the expunging of those clauses was the act of the board of health itself. He was not going to join issue with his learned friend upon that subject, as he had not been accurately informed respecting it. But he held in his hand their petition presented to this House against the bill; and their lordships would find that it was signed by a majority of the members of the local board. That board consisted of eight members, five of whom, including the reverend chairman, had signed the petition. They said that the reason they were not present by counsel was that they had no funds applicable to defraying the necessary expenses. It certainly would be a very improper thing for these gentlemen, there being no funds intrusted to them for the purpose, had they misappropriated the moneys coming into their hands to the maintenance of an opposition to the bill, and it could not be expected that they should dip into their own pockets to meet such expenses, they said your petitioners do not feel justified on pecuniary grounds in appearing.

Mr. CLERK objected to any allegation in the petition being read, as there was no appearance upon it.

The CHAIRMAN: Has the petition been referred to the committee?

Serjeant WHEELER: I am stating the reason why they are not here by counsel.

The CHAIRMAN: Are you going to call any of them?

Serjeant WHEELER said he did not know whether any of them would be among his witnesses. The petitioners stated that they did not feel justified in appearing to oppose the bill, inasmuch as the Act of Parliament under which they were constituted a board of health did not provide funds for the purpose. They also said that there were several clauses and provisions omitted from the bill which ought to be there, and others inserted which ought to be omitted, and they complained that in the House of Commons a series of clauses were struck out of the bill, which might operate very prejudicially to their interests. Now, he (Serjeant Wheeler) was assuming that the clauses so expunged from the bill were irrevocably expunged, and the way in which he sought to use this petition was an argument for the necessity which that fact entailed upon him to ask their lordships to insert in the bill such limitations as in their wisdom they might think proper, so as to keep the price of gas at the lowest possible limit, and prevent the consumers in Elland from being taxed unnecessarily for the supply of that necessary article. He would briefly allude to the points of the bill which it appeared to be essential he should bring under the notice of the committee. In the preamble, there was a statement as to the money expended by the company, partly arising out of the issue of shares, and partly out of the profits of the undertaking. The only purpose for which he referred to that was to show that if there was to be, as by this bill there would be, a number of shares, which were to be considered as paid-up shares in respect to that capital so expended to the extent of the dividends, that in all time to come would be paid upon those shares so created, it was a tax upon the gas-consuming community, and, therefore, it was necessary the committee should take care that no capital should be credited to the company, but such as had rarely been proved to be expended upon the undertaking. The 16th and 17th sections related to the capital of the company, and the apportionment of shares in respect of money already invested in the works, and his learned friend, by way of explanation, had informed the committee that such shares would only be entitled to a dividend of 4s. each per annum. But, according to the provisions of this bill, that was not the case. It was true they would be entitled in priority to a fixed preferential dividend of 4s.; but, that was not stated to be the limit of the advantage which they were to derive in future. It simply came to this, that whatever else the company could pay upon those shares, they were entitled to a fixed preferential dividend in perpetuity of 4s. per share per annum. Their lordships had heard that there had been an expenditure of £1200, in respect of which a debt had been created, and therefore there was no pretence for saying that there ought to be shares created to cover that sum. He ventured most respectfully to submit that no paid capital ought to be declared as paid under the 17th section, but such as actually represented the money expended upon the undertaking. He now passed to another point, viz.—that which related to the price at which the company should supply gas. The promoters had called before the committee two gentlemen of considerable experience, Mr. Hawksley and Mr. Barlow, who had given it as their opinion that the price fixed in the bill was a very moderate one. But, after all, these were mere opinions—mere theories—having more or less of fact to depend upon. Without troubling their lordships by going into details upon the subject, he could refer to a point which was entirely conclusive upon the point, and completely disposed of the theory of Messrs. Hawksley and Barlow. The plan of the district which had been put in, showed the position of the works of Messrs. Shaw, near Stainland. The mains of the company passed from their works to Elland, and thence to Browbridge to the establishment of Messrs. Shaw, two miles from the gas-works. It had been given in evidence that Messrs. Shaw had been supplied with gas at 3s. 4½d. per 1000 cubic feet. Now, if at so great a distance the company could supply gas profitably to themselves at 3s. 4½d., he would ask why should the consumers of Elland, whom he represented, and who were so much nearer the gas-works, be saddled in perpetuity with a 5s. rate? It was said that these gentlemen were very large consumers. That might be, but the committee would remember the nominal charge to Messrs. Shaw was 5s., which was reduced by discounts to the lower sum he had mentioned; and the witness examined upon the subject said, in effect, "Just you come and consume as much gas as Messrs. Shaw, and we will charge you the same price." Now he (Serjeant Wheeler) felt that he should have their lordships sanction to this statement that, if there was any system more fraught with evil to the community in such a matter than another, that of keeping up the price to the maximum, and allowing discount at the option of the company, according to the quantity of gas consumed, was the one. He could conceive of nothing more pernicious. There was no obligation to give it at all; if given to one, there was no obligation to give it to another in precisely the same circumstances, consuming the same quantity, and may be an adjoining occupier. It was entirely at the whim and caprice of the company, and he would submit to their lordships whether his clients were not perfectly right in complaining of this system altogether, and in demanding that the maximum in this bill should be a moderate maximum? And there was another point, in connexion with this part of the subject, to which he wished to call the attention of their lordships. Mr. Hawksley had told them that these works were very advantageously situated. He spoke of them as being at a low level, as adjoining the canal and railway, the effect of which was, that the company were able to get their coal and cannel at very moderate prices, and, at a considerable saving of expense, dispose of

their products. Upon what principle, then, were those who lived near the works, supposing it were fair that those in the outlying districts should be charged 5s. per 1000, to be deprived of the benefit of their position, and be supplied at a lower rate? It was by no means an unusual thing to have a differential charge. The borough of Halifax had been cited; there, the charge within the municipal boundary was 4s., and beyond 5s. If the Elland Gas Company chose to have a large district, he was not there to ask the committee to refuse their sanction to it; but he was there to ask that his clients should not be taxed to enable the company to supply the district beyond them. The principle which the petitioners said should be applied was the principle which Parliament had applied at Halifax, and also at Huddersfield, and the adjoining township of Sowerby Bridge, during the present session—viz., that of differential charge having relation to the position of those who were supplied by the company.

Earl AMHERST: Do you intend to propose a clause to that effect?

Serjeant WHEELER said the petitioners had prepared an amendment of the existing clause on the subject, the effect of which was that the maximum price at which gas should be sold by the company to all persons within a radius of one mile from the Market Cross in Elland, who should consume the same by meter, should not exceed 4s. per 1000 cubic feet; and, beyond that distance, not exceeding 5s. per 1000 cubic feet. This really was the whole principle upon which the opposition of the consumers, whom he represented, was based. There were some other provisions which they required to have inserted, but those were comparatively unimportant, except one, which had relation to meters. The petitioners also submitted—and, he thought, with some fairness—that the district beyond Elland ought not to be supplied with gas until the whole of that township was supplied. Heretofore, the supply of gas had been insufficient in quantity, and bad in quality, and the petitioners very properly asked that they should be secured an adequate supply, of good quality, before the company were allowed to extend their limits. In doing so, they only sought to carry out the principle contained in the maxim, "Charity begins at home."

Mr. CLERK said he should object to any evidence being given on that subject. There was no allegation in the petition to the effect that there was a deficiency of gas, or that the quality was bad; and not a single question had been put to the witnesses which could raise that issue.

Serjeant WHEELER said he thought he was fairly entitled to give evidence upon it. There was no specific allegation in the petition to that effect, but there was a general allegation which embraced it.

Mr. *Samuel Burgess Gunnell*, examined by Serjeant WHEELER.

I am one of the private-bill clerks of the House of Commons.

The CHAIRMAN: What are you going to prove?

Serjeant WHEELER: Simply to prove the appearance of the petitioners in the House of Commons.

The CHAIRMAN: We have got the evidence referred to here.

Mr. CLERK: There is no dispute upon this fact, that the consumers did not appear by counsel; but that, while the discussion upon clauses was going on, Mr. Pike, their parliamentary agent, and Mr. Wavell, their solicitor, appeared at the table, and took part in the matter.

Mr. *Richard Horsfall*, examined by Mr. PHILBRICK.

I am a land-surveyor and architect at Halifax. I coloured the plan now before the committee, which shows that the district proposed by this bill to be supplied, contains 7000 acres. The part coloured red, shows the limits of the jurisdiction of the local board; the darker part, the more populated portions of the Elland district; and the blue, the districts of Browbridge and West Vale. I know the whole of the district very well, and have been employed in the erection of new works there, to the extent of £30,000. I am the architect for Messrs. Shaw and Sons. I understand they are the largest consumers of gas in the present district of the company. The population of the southern and western parts of the proposed district is very small, there being a great deal of moor land there. The company's mains go through Browbridge to supply Shaw and Sons by one route, and by another to supply the village of Stainland. There are no mills at Stainland supplied with gas. The great proportion of the mills in the district is within a mile radius. Messrs. Shaw's works are not within that radius. In point of level, they are 170 feet above the level of the gas-works; so that, if the pressure of gas in the mains were feeble, the parties between them and the works would suffer from want of gas. Stainland is about 510 feet above the gas-works at Elland, so that the same effect would follow in reference to consumers between there and the gas-works, if the pressure were feeble. I have seen the petition presented against this bill; and I have ascertained the consumption of gas by the persons whose signatures are attached to it. The total consumption I make to be 5 million cubic feet, collecting it from their last year's gas bills. Of this consumption, 2,353,700 cubic feet are consumed at Browbridge, and 2,665,000 in Elland. I know many of the present shareholders in the company; they are very small consumers of gas. I know that Messrs. Shaw have experienced a deficiency of gas.

Mr. CLERK said he should object to that evidence. By a standing order of the other House of Parliament, no petitioner could go into any grounds of objection to a scheme before a committee, unless his objection was stated specifically in the petition. It was quite true there was no such standing order in their lordships House, but he thought he might appeal to the noble lord in the chair, that the universal practice was the same in this respect, and that it was never permitted to parties to go into objections which they had not thought fit to allege in their petition. The parties for whom his learned friend (Serjeant Wheeler), appeared, stated four grounds of objection to the bill, viz., the limits of district proposed to be supplied, the capital to be allowed, the price to be charged, and the absence of provisions enabling the local board to take the works. But there was not a single other objection raised in the petition. There was a sort of general allegation that the petitioners did not intend to confine themselves to the objections they had specified, but that these were the salient points. He (Mr. Clerk) submitted that they could not be allowed to do so, nor to give evidence on points which were neither raised by their petition, nor by the cross-examination of the promoters witnesses. If this were allowed, it would be impossible for those who were promoting a scheme, to have an opportunity of meeting the objections brought against it. The company's case was closed, and they had now no means of answering this imaginary grievance of a deficiency of supply.

Serjeant WHEELER said this was a question flowing out of the largeness of the limits sought to be supplied by this bill. The witness was being examined as to the effect which he produced by the company's pipes going into Stainland, upon the nearer consumers, and he proved that the moment there was any deficiency of gas, it was felt by those nearest the company's works.

The CHAIRMAN said he thought this was included under the first allegation. The learned serjeant must confine himself to the petition.

Examination continued: I know there has been a deficiency of supply at Messrs. Shaw's. With the cost of coal I am not thoroughly acquainted; but some two or three years ago, a contract expired that had been made between Messrs. Shaw and the Elland Gas Company, and there was some little doubt as to the price at which they should be supplied with gas.

Mr. CLERK: How do you know anything of this contract?

Witness: I am going to give this in answer as to the price of manufacturing gas.

Mr. CLERK: How do you know anything about it?

Witness: I know I had instructions to prepare plans for the erection of gas-works, if the price were raised.

Cross-examined by Mr. CLERK: There are no mills supplied with gas at Stainland. There is only one mill there, and they make their own gas. I cannot say whether there may not have been something wrong with their works during the last two months, as they have been making alterations there, and whether they may not have required gas from the company.

Mr. CLERK: Do you know that as much as one-third of the gas supplied by the company is supplied to Stainland?

Witness: No; unless you include the supply to Messrs. Shaw's works, which are in the township. They are supplied from the company's works, and so is the village of Stainland. Messrs. Miller and Firth's works are also supplied, but that is a separate district; it is beyond the circle. I do not know what the total quantity of gas supplied by the company is. I obtained my information of the quantity consumed by the petitioners from the accounts furnished by the company. I do not deny that out of the 367 signatures to the petition, only 84 are consumers of gas.

Mr. CLERK: You have heard it stated that only 3 million feet of gas are consumed annually by the petitioners.

Witness: In answer to that, I say that the quantity consumed by the parties who signed the petition amounts to 5 millions, which I obtained from your own accounts.

Mr. CLERK: How did you obtain the information?

Witness: As many accounts as could be got from the parties who signed the petition were obtained, and the quantity consumed by them was put opposite to their names. I have not got those accounts here.

The CHAIRMAN: You ought to produce them.

Mr. CLERK: You venture to come here to contradict a gentleman who says he has been through the books. I have here the names of every person we supply, and the amount of gas they consume.

Serjeant WHEELER: The witness tells you the way in which he obtained his information.

The CHAIRMAN: But he has not produced the accounts, nor told us how he got them; and he is contradicting evidence given on the other side by a gentleman who has been through the books.

Mr. CLERK: If he will tell us who, out of the eighty-four consumers signing the petition, have consumed 5 million cubic feet of gas, we can check it by the books. [To witness.] You say you know that Messrs. Shaw have complained of an inefficient supply?

Witness: I do.

Mr. CLERK: You know that it has been stated on oath that they have petitioned in favour of this bill?

Witness: I have heard it so stated.

Mr. *John Maude*, examined by Mr. PHILBRICK.

I am one of the partners in the firm of John Maude and Company, worsted-spinners, at West Vale and Browbridge. We employ about 300 workpeople at present, and our works are being extended. We are rated at £800 per annum. In carrying on our business, we require gas of good quality, not only for the purpose of lighting, but in preparing the wool; we also require it for finishing and cleansing the yarn. If we could get it of a good quality, and at a moderate price, we should be very large consumers. Our present consumption is about 600,000 feet annually. If the gas is bad in quality, it injures our goods. We had to make many complaints some time since, but we are better supplied at present, as the company have laid down an extra main. Formerly, we could not get sufficient gas in the morning to light up with; and sometimes, when we did get it, it went out, the reason being that Messrs. Shaw's works being at a greater elevation, drew the gas from us. Within the last year or two, I must certainly say we have been better supplied. I will give the company credit, also, for giving us better quality, particularly since this bill was introduced into the House. I was present in the House of Commons, but was not examined.

Mr. CLERK: You state that you are rated at £800. I see that you are rated for your mansion-house, spinning-room, new warehouse, and improved buildings. Do you mean to say that you are rated at £800 for them?

Witness: It may be a little over, or a little under.

Mr. CLERK: Supposing it comes to about £300, is that within your definition of "about?"

Witness: I should say it is £750, or thereabouts.

Mr. CLERK: You are one of the overseers of the poor, and I see you are rated at £310. 5s.; do you mean to say that you ought to be rated at £750?

Witness: I have another new mill, which I erected two or three years ago, and for which I pay the rates; £310 only includes the old buildings. In the new place, one room is assessed at £136. I am not aware whether that is rated in the name of the tenant.

The CHAIRMAN: Still, you can tell us for which property you are rated. What is this £310 for? Is that for where you reside?

Witness: It is for the warehouse which was built ten years ago, the house in which I reside, and other improved buildings. This is an assessment on which I have been rated to the poor for years. Two years ago, I erected a new mill, and put down two 35-horse engines, which should be in the rate-book.

The CHAIRMAN: Would that be rated at £490 a year?

Witness: It is rated at nearly £500 a year; there is one room rated at £136.

By Mr. CLERK: I occupy a part of it myself. I am not aware that other parties appear in the rate-book for those premises as I pay the rates. The occupiers are Messrs. Nuttall and Co., and Messrs. Whitby and Co. They are rated at £290 for the part they occupy. [Rate-book handed to witness.] I cannot tell by this book for what other property I am rated beyond the £310. In the general valuation book, one of the rates of that property is assessed to me.

Mr. CLERK: You tell us you want to have cheap and good gas. Are you satisfied that gas, equal in intensity to 14 sperm candles, will be good gas?

Witness: I believe it will.

Mr. CLERK: What price do you pay for your gas, when the discount is deducted?

Witness: Last year, with my consumption, the largest amount of discount the company allow, that is 25 per cent., bringing the price down to about 3s. 9d.

Cross-examination continued: I know that discount in proportion is allowed to large consumers. I was present in the House of Commons when the discussion took place with regard to the price of gas. I believe Mr. Wavell took part in that discussion. I cannot say whether the maximum price upon his representation was reduced by the committee from 5s. 6d. to 5s. I know that it was reduced after the discussion took place, and that the illuminating power was raised from 12 to 14 candles. I am not aware whether there was a power inserted in the bill enabling individual consumers to test the gas on giving notice.

Re-examined by Serjeant WHEELER: The actual price we pay at present is 3s. 9d. That is a payment I do not object to. All we desire is that in future we should be secured a supply of gas at the price we now pay. In Yorkshire, it is a common thing to let off "room and power." I do so; and, in respect to that which I let in that way, I pay the rates which makes me a ratepayer to the amount I mentioned.

Mr. *Thomas Livesey*, examined by Mr. PHILBRICK.

I am a cotton-spinner at Rochdale, an alderman of the borough, and chairman of the gas-works committee of the corporation. As chairman of the committee, I have an intimate acquaintance with the question of the supply of gas, and of the materials required in it. I have been on the committee since 1844. The coal used by us we obtained last year from Barnsley. That coal comes through Elland, a distance of twenty-five miles, which increases the price beyond which they would pay for it by the additional cost of cartage. Our charge for gas is 4s. in the borough of Rochdale, and 4s. 6d. and 5s. outside the borough, with discounts to large consumers. That brings the lowest actual price to 3s. 3d., and outside the borough to 3s. 9d. We use a great quantity of cannel in the manufacture of our gas—about four-fifths; the remaining is ordinary coal. The gas we supply is of very superior quality, our illuminating power being fully equal to 20 sperm candles,

By the CHAIRMAN: The maximum fixed in our Act is 5s. per 1000. The Act was passed in 1853.

By Mr. PHILBRICK: As chairman of the gas committee, and having had considerable experience in the matter, I think there ought to be a differential charge to outlying districts, inasmuch as the cost of supplying them is greater; the leakage is also in proportion to the distance from the works; and the expenses of collection and management are increased. The effect of one uniform price prevailing is to make the nearer consumers pay for the outlying ones. We do not supply our customers with meters on hire; we sell meters to them at cost price. The price of gas at Rochdale has been reduced very much of late years, and the consumption has increased very rapidly. When we purchased the works in 1844, the price of gas was 7s. per 1000; we reduced it to 6s. the first year, then to 5s., then to 4s. 6d., and subsequently to 4s. Every decrease of price has tended to increase the consumption, and add to our profits. We gave £20,000 for the works, when we purchased them from the company in 1844. Since that time, we have paid over more money into the hands of the treasurer, from the profits of the works, for the improvement of the town than the works cost us.

By the CHAIRMAN: The differential charges are fixed by the committee, and are not prescribed in our Act.

By Mr. PHILBRICK: I only know Elland by passing through it on the railway. I am not intimately acquainted with it.

Mr. CLERK: That, I suppose, is the reason you have been brought here as a witness?

Witness: I do not know. I was asked to come.

Cross-examined by Mr. CLERK: The population of Rochdale, at the last census, was 38,000. That is not the total population we supply, but is the population within the borough, where we charge 4s. per 1000. We have, in the outlying district, a population of from 10,000 to 15,000. Rochdale is a radius of from three-quarters of a mile from the gas-works; and I dare say that the farthest customers that we supply are at a distance of two miles and a half. In some directions, within three-quarters of a mile from the works, the district is populous, and in some it is not. The population is considerably thinner outside. Our total manufacture of gas, for the year 1860, was 91,348,000 cubic feet. The differential rate of gas is one that, we think, as a matter of policy, we should give to the consumers. We charge up to 100,000 and under 400,000 feet, 3s. 9d., above 400,000 feet, 3s. 6d., and 800,000 feet, 3s. 3d. The consumer would have to pay us £180 a year in gas rent in order to get the reduction to 3s. 3d. If his consumption was only £100 a year, he would pay 3s. 9d. Four-fifths of our coal is cannel; we feel it necessary to give that to our customers. We give 20 sperm candles; in fact, we get as good a gas as possible. We get our coal from Barnsley, and our cannel from Wigan by railway. The price of coal for which we have contracted for the last six months, is rather less that it was. Last year, it was a little over 10s. a ton; this year, it is about 9s. 8d. For the year ending March 1860, the price on the average was 8s. per ton. The price of cannel was 15s. 1½d. per ton.

Mr. CLERK: In order to give 14-candle gas, I suppose you must use a great deal of cannel?

Witness: I think not. I think the ordinary coal with good management will give 14-candle gas.

Mr. CLERK: But, if we are to give a consumer 14 candles, we shall have to make it more than that.

Witness: The gas will vary a little; but, I think an increase of 2 candles will give it.

Re-examined by Serjeant WHEELER: We are about 26 miles from Wigan. There is no requirement in our Act to make a differential rate, nor to give the consumers 20-candle gas, but we think it a proper scale to lay down. The committee are now discussing the propriety of reducing the price of gas from 4s.: we have had it under discussion two evenings.

Serjeant WHEELER: You have told us that the works are in the hands of the corporation: do you think, as a public man——

Mr. CLERK: I shall certainly object to any inquiry on this subject. I have not cross-examined the witness upon it.

Serjeant WHEELER: I am only reminding the witness of the evidence he gave, and I want to ask him whether from his experience——

Mr. CLERK: I must again object.

The CHAIRMAN ruled that the question could not be put.

Mr. *Horsfall*, in answer to Earl Amherst, said Elland Cross was 450 yards from the gas-works in one line, viz.—from north to south, but from east to west, which was the district in which the manufactories lie; it was about 100 yards.

G. W. Stevenson, Esq, examined by Mr. PHILBRICK.

I am gas engineer to the corporation of Halifax, who own the gas-works in that town. I know Elland very well, and have visited the works there. They are very favourably situated for getting a supply of coal. There is a canal adjoining the coal-store, so that they can unload the boats directly into it. The railway also runs alongside the warehouse, so that they could have a siding into the works. The works are admirably situated for supplying the district, being at the lowest level. Browbridge and Elland are the best seats of the manufacturing interest in that district. I think that for 4s. per 1000 feet gas of 14-candles power could be manufactured and sold in Elland, so as to leave a very handsome profit to the company. That would supply to a mile radius from the Market Cross at Elland. Beyond that radius, to cover increased leakage, cost of supervision and collection, and for unproductive mains in a thinly-populated district, I should put on another 1s. per 1000 feet. As engineer to the corporation of Halifax, I know their regulations and works generally. They are not situated nearly so favourably as those at Elland. They are at some distance from the canal and railway, and are in a very awkward situation. After paying the expenses of manufacture, repairs, and collection, the cost per 1000 feet at Halifax is 1s. 6¾d. [18·71d.]; that does not include leakage. Taking into consideration interest on capital, and the gas actually sold, the net cost is under 2s. 6d. per 1000. The quality varies from 16 to 17 sperm candles. Although our Act of Parliament fixes the illuminating power at 12 wax candles, the public demand a better quality of gas. We charge a maximum of 4s. within the borough, with a reduction to large consumers, bringing down the price to 3s. 2½d.; and, beyond the limits of the borough, 5s., with discounts in the same proportion. The average price over the whole district supplied is 3s. 7½d.

By the CHAIRMAN: The maximum under the Act is 4s. in the borough; and, beyond the borough, there is no obligation upon us to supply gas.

By Mr. PHILBRICK: When the corporation took the works of the company, they were in a very dilapidated state, and they had very nearly to be reconstructed; but, notwithstanding all that outlay, we clear 11 per cent. profit. I cannot tell the acreage of the borough of Halifax. There are several reasons why gas can be supplied cheaper nearer to the works. The further you get away from the point of manufacture, of course there has to be a greater length of pipeage, which increases the leakage; the supervision and collection are further afield, and cost more, and take more time. The pipeage connexion with a gas or water-work is perhaps the largest item in the undertaking; and, in proportion as you get away from the works, all the expenses are increased, and therefore there ought to be a different charge to the consumers at a distance.

Mr. PHILBRICK: With regard to the supervision respecting meters, do you consider that a fair provision in the bill?

Witness: I think it is suicidal, on the part of the company, if they want to sell gas. The objection is, that the company require every consumer of gas to purchase his meter. In the first instance, they make it compulsory upon a consumer to burn by meter, and then make it compulsory upon him to purchase the meter, instead of adopting the ordinary course of letting out meters on hire, at remunerative charges. I think the clause, as it now stands, would be prohibitory to the consumption of gas by small consumers. With regard to the pipe-clause, the practical effect of it would be that any one beyond a distance of 15 feet from a main of the company cannot demand to have a supply of gas. He would be required to pay for the communication between the main-pipe and his premises. The company would be enabled to lay the pipes down under their own Act, but the private individual has no power to break up the streets to take it up again, when he ceases to be supplied; so that the services would, in the end, become the property of the company.

Cross-examined by Mr. CLERK: I was a witness in the House of Commons, with respect to the question of limits. The population of Halifax, within the borough, is 38,000. Our manufacture of gas is about 100 million feet per annum. The borough is very widely spread, and the supply of gas, at 4s. per 1000, extends 1½ mile from the works. We get the 5s. price within a mile of the radius outside the borough, but there is not much gas sold within the mile radius beyond the borough. Some part of the borough does not extend a mile from the works. I am not prepared to say what the population of Elland proper is: I should think it is as much as 3000. The quantity of gas consumed in the district, I have heard, is 9 million cubic feet per annum; but I assume the quantity manufactured is 12 million feet. The quantity consumed in Halifax, last year, was 84 millions; so that the Elland consumption was about one-tenth of ours. We have 40 miles of mains altogether; I cannot tell how many within the borough. I cannot tell the exact quantity of gas consumed in the borough; but it is the largest portion. The greatest distance we go from the borough is about 1½ mile from the works, in each direction.

Mr. CLERK: The clause in this bill to which you referred as suicidal, is this: "Every consumer of gas may be required by the company to consume gas by meter, and the company may be required by every consumer to supply the same by meter, to be provided by the company at the expense of the consumer, or to be approved of by the company if provided by the consumer." Under that clause, all that is necessary is for the company to approve of it?

Witness: Yes.

Mr. CLERK: Is that an unusual clause?

Witness: I mean to say, it is a suicidal clause.

Mr. CLERK: Are you a suicidal people in Halifax? I see this clause is, in your Act, "Every private consumer of gas supplied by the local board shall, upon request in writing by the local board, consume gas by meter, to be provided at his expense; and every meter provided by a consumer shall be approved of by the local board, before it is put up and used."

Witness: We have a subsequent Act to that, in which we have incorporated the Gas-Works Clauses Act.

Mr. CLERK: But not altering this clause?

Witness: I do not know. We do practically supply meters on hire in Halifax.

Mr. CLERK: But you have this power in your Act?

Witness: Yes; and, when the corporation bought the works, the whole of the meters belonged to the consumers, or nearly all. There have been 3600 consumers added since, almost the whole of whom have their meters on hire.

Mr. CLERK: Pray, were you without gas some days last winter?

Witness: Yes; one night and two days.

Mr. CLERK: What is your price of coal at Halifax?

Witness: Eight shillings and ninepence per ton for both cannel and coal; it is Yorkshire cannel.

Re-examined by Serjeant WHEELER: As soon as we get beyond the borough, our 5s. price begins.

Mr. *George Anderson*, examined by Mr. PHILBRICK.

I have no particular knowledge of the Elland district, but I have heard the whole of the evidence on this inquiry, and I think that gas could be manufactured and sold there for something about 3s. 9d., or, with a very handsome profit, at 4s., within the inner district, and 5s. beyond. I quite confirm the whole of Mr. Stevenson's evidence as to the propriety of a differential rate. If there is a uniform price over the whole area, you make

the people near home pay for those who are further off; and, in a time of scarcity of gas, those who are further off get the best supply.

Cross-examined by Mr. CLERK: At the Dover works, of which I am the lessee, we make 50 million feet of gas per annum. I think there are 16 or 18 miles of pipe there, through which the gas passes.

Mr. CLERK: Have you more than 12 miles of mains?

Witness: We supply gas——

Mr. CLERK: Answer specifically. Have you more than 12 miles of mains.

Witness: I do not know that we have more, but I must give this explanation—that there are 4 or 5 miles more of pipe, through which gas passes, that do not belong to us, and which, in ordinary circumstances and in other towns, do belong to the gas company. I think the average price of gas at Dover, with the discounts, is 4s. 3d. per 1000. The nominal price is 6s.; it is invoiced at that. I may say, however, that I do not approve of that plan of giving such enormous discounts to large consumers. It is not a practice which prevails very largely. I believe that large consumers should have an advantage. I do not know much of the densely-populated parts of Elland.

The CHAIRMAN: He does not know the place at all.

Re-examined by Serjeant WHEELER: At Dover, we have to pay 1s. 9d. per ton on our coals for town-dues, and we pay as much for freight as the people at Elland pay for their coals altogether; but, notwithstanding this, we are able to supply gas at 4s. 3d. per 1000.

By Mr. CLERK: We pay from 17s. to 19s. per ton for coals, according to the cost of freight. We get about 9s. per chaldron for coke, which we have a bad sale for, and have to send half way up to London to get rid of.

Mr. *R. Wavell*, examined by Serjeant WHEELER.

I have been in practice for many years as a solicitor, and am the town-clerk of Halifax. I was solicitor to the petitioners against this bill when before the House of Commons. The owners and occupiers of property in Elland presented a petition against another bill (the Sowerby Bridge Gas Bill), which was in the same group, which petition was intended to be withdrawn; but, by some accident, we had one petition too much presented against that bill, and none against this. I was in the committee as representing the corporation of Halifax, who also petitioned against this bill. When we came to consider the price of gas, the chairman of the committee asked me what we desired, and I said we desired to be placed in the same position as the consumers at Sowerby Bridge—viz., to be supplied at 3s. 6d. per 1000. The discussion was almost momentary. The chairman inquired if we should be satisfied with 4s.; and at that moment some active promoter of the bill put in a note of the charge at Halifax—not in the borough—in which 5s. was charged; that got possession of the mind of the committee, and they fixed the price in this bill at 5s. I never intended, by deed or word, to sanction that price. The petitioners, for whom I appear to be heard to-day, were distinctly objected to. It was objected that we had not a right to be heard. All my witnesses were in the room, but they were not examined.

Serjeant WHEELER: Some reference has been made to what took place with Lord Redesdale respecting the capital clause of this bill.

Witness: The alteration in the capital clause was not known to me till a few days after the committee of the House of Commons. I sought, on the ground of the alteration of that clause, to have a re-hearing before that committee, but the promoters of the bill objected. The committee at first agreed to it, but, as the promoters objected, they declined. I at the same time offered not to oppose the bill in the House of Lords. Upon reading that clause to the secretary to Lord Redesdale, he suggested that it should be pointed out to his lordship. I therefore attended an appointment last Friday, which was adjourned until Tuesday. When before Lord Redesdale, the other side objected to my being heard, and his lordship said, "I can give no opinion that will prejudice the matter before the committee, this being an opposed bill." I know the district proposed to be supplied with gas. The manufacturing importance of it is in the centre of the town of Elland, and at Browbridge, about three-quarters of a mile from the gas-works. I produce the Sowerby Bridge Gas Bill, which has passed the committee of this House. That district adjoins the Elland, and corresponds in character with it. The provisions in that bill are, that the maximum price at Sowerby shall not exceed 4s. 2d., and, in the outer district, 5s. per 1000 feet. The illuminating power has been reduced from 14 to 12 candles; but, in my judgment, the local board having possession of the works, many of the objections which exist in the present case are removed, and there is less necessity for for such stringent provisions. At Huddersfield, which also adjoins this district, the Act of this session fixes the maximum at 4s. within the limits and 5s. beyond, with a supply to the public lamps at 2s. 6d. per 1000 feet. There is no provision in this bill as to the charge for the public lamps.

By the CHAIRMAN: Huddersfield has a population of 30,000.

By Serjeant WHEELER: My attention has been called to the propriety of the consumers near the works having a priority of supply. Without such a provision, the outlying districts will always have gas; but, in case of a deficiency, those in immediate connexion with the works will be without, or will have a very feeble and inefficient supply. With the view of meeting this difficulty, I have prepared an amendment similar to that which was proposed in the case of the borough of Halifax, to the effect that the district for which the works were immediately designed should be supplied before the outlying districts.

Cross-examined by Mr. CLERK: I do not know that these works were originally designed not for the supply of Elland alone, nor that for years the company have been supplying Stainland. I believe the contrary. I have had some experience of the practice of Parliament in reference to the opposition of private bills. I did not three days before the committee of the House of Commons sat on this inquiry send for a filled-up copy of the bill. I received one late on the Monday night, as four bills in which I was solicitor came before the committee on the Tuesday morning. The whole of the discussion upon the Sowerby Bridge Bill came before the Elland.

The CHAIRMAN: I do not know that it much signifies what took place before the committee of the House of Commons.

Mr. CLERK: This gentleman states that it was unknown to him that this clause in the bill with regard to the capital had been altered. (To witness:) Was not this clause in the bill which was sent to you on the Monday night before the inquiry?

Witness: I have no doubt that it was, but I have no recollection of seeing it until after the discussion in the House of Commons. I have no doubt our Parliamentary agents had a copy of the bill. I distinctly agreed to be satisfied if we could have the matter re-heard before that committee. The parliamentary or municipal borough of Halifax has a population of about 38,000.

This closed the case for the petitioners, and the committee, without hearing the learned counsel on either side sum up or reply, directed the room to be cleared. After remaining in deliberation a few minutes, the doors were again opened, and, on the parties appearing,

The CHAIRMAN said the committee were of opinion that, no case at all has been made out calling for any alteration in the bill, and therefore the clauses would not be gone into.

The bill accordingly passed, without any amendment.

HOUSE OF COMMONS.

(*Before Mr.* PUGH, *Chairman; Sir* EDWARD KERRISON, *Mr.* F. W. RUSSELL, *Mr.* WILBRAHAM EGERTON, *and Mr.* KER.)

STOCKPORT DISTRICT WATER-WORKS BILL.

TUESDAY, MAY 9.

Sir W. ALEXANDER, Q.C., Mr. RODWELL, Q.C., and Mr. CRIPPS, appeared for the promoters; Mr. JOHNSON, and Mr. WEBSTER, for Colonel Davenport, one of the petitioners against the bill; Sir FREDERICK SLADE, Q.C., and Serjeant WHEELER, for certain millowners. The trustees of certain turnpike roads petitioned against the bill, but were unrepresented.

Sir W. ALEXANDER, in opening the case, said he appeared on behalf of the bill for better supplying with water the borough of Stockport, in the counties of Chester and Lancaster, and the several towns adjacent or near thereto in those counties. The borough of Stockport lay on both sides of the river Mersey, which flowed onward till it came to the large estuary of Liverpool, and by that means it was both in the counties of Lancaster and Chester. The inhabitants, in 1851, were 54,000; and, at the present time, the inhabitants of the borough, and of the district which it was intended to supply, might be said to amount to 67,000 persons. If any of the members of the committee knew anything of Stockport, they would know that the inhabitants consisted principally of the poorer and working classes, employed in numerous mills which studded the whole borough, and with whom it was a matter of vital importance to have an abundant supply of good and wholesome water. Now, up to the present moment, the borough of Stockport was supplied by the existing Stockport Water Company, which supplied the borough by pumping from a place now actually within the town of Stockport, so fast had the dwellings and various works grown up. The water was pumped from the river Goyt, and supplied to the inhabitants; but the numerous mills, and factories, and spinning-works, and a large population, extending along the banks of the river, had so polluted the river, that it was now totally unfit for human use. It could only be used with safety, or with comfort, for ordinary domestic purposes, and could not be used for drinking purposes without injury to the human constitution. He might shortly state what the sources of supply to the river were; and, in so doing, he would carry them from Stockport up the stream. They would see that Stockport was traversed by that stream called the Goyt or the Mersey; and, if they followed the stream upwards, they would find this joined by the river Goyt proper, and that was composed of the river Kinder, which went into it for about two miles and upwards, to a point at which it joined the river. But, besides that, the river Goyt derived some sources of supply from the river Etherow. The river Etherow was on the northern part of the map, and that river originally formed a rather abundant feeder to the river Goyt.

The CHAIRMAN asked whether it was not called the river Goyt at the junction with the Etherow?

Sir W. ALEXANDER replied that it was. The Stockport people called it indifferently the Mersey or Goyt, just as they had been in the habit of pronouncing the name. The river Goyt rose from the neighbourhood of Chapel-en-le-Frith, in Derbyshire, then ran down to New Mills, and then down to Stockport. The river Etherow rose in the moors in Yorkshire, and ran down and joined the Goyt. On the north-easterly portion of the river Etherow reservoirs had been erected for the supply of Manchester with water. The town of Stockport was, therefore, deprived of a portion of the supply of the river Etherow in consequence of the water being turned aside for the purpose of supplying these large reservoirs. Those were works of recent date, and certainly their existence was not thought of at the time the first supply of water was laid on for the borough of Stockport. Then, as the eyes of the committee were upon the map, he should mention to them that the numerous little yellow spots or dots which were marked on the banks of the various rivers, represented the print-works, calico-works, and all sorts of manufactories. In point of fact, he believed he should be able to show them that no fewer than ninety-one print works were there, every one of which was calculated to affect the Mersey, or the rivers which flowed into it, and thus taint it with the pollutions which these rivers brought down with them. It was in the year 1825 that the first Act of Parliament was obtained for supplying the borough of Stockport with water, and that was by Mr. Peter Marsland, a gentleman of considerable property, residing in Stockport. He was the proprietor of certain ancient mills within the borough of Stockport, and, by virtue of those mills, had the right to certain waterfalls for the purpose of working those mills—certain rights upon the river Mersey—and, when this scheme was propounded, he obtained water by pumping from a place now situated in the town of Stockport, though it was then at the outskirts of the town—Park Mills. It was possible and highly probable that the river was not so dotted at that time with these print-works as it was now; and it was probable that when Mr. Marsland got his Act of Parliament in 1825, the supply was abundant; and that, from the paucity of mills and works, the water was of a purer quality than it was now. It so continued under the control of Mr. Marsland, till, upon his death in 1853, his representatives conveyed the works to a company, which was the company called for distinction in the present case—the old company. That was incorporated under the Joint Stock Company's Act; and, from that time up to the present, they had been in the habit of supplying Stockport with water in the manner already described. From 1825 to 1847, resort had not been made to any filtration of the water; but in 1847, it was found that the increase of manufactories and population along the banks of the river even then rendered necessary the process of filtration; and, with a view to purifying the water, since that time the old company had filtered the water which they supplied to the town of Stockport through filtering-beds, but which filtration had, nevertheless, not been completely successful, and for this reason:—among modern improvements in science, it had been found necessary in calico-printing for fixing the colours that a composition of arsenic should be largely introduced into their works, and the consequence was that the arsenic had been communicated to the river, and no process of filtration would now purify it from those noxious ingredients. That was only one of the poisonous substances which had of late years tended to pollute the stream. With a view to avoid this nuisance, and to obtain water in its original purity, the old company commenced a course of expensive litigation with millowners for having polluted the stream. Now, the Act of Parliament of 1825, which gave Mr. Marsland the power to supply the borough of Stockport with water, of course, conferred no more rights upon him than he before possessed as the owner of property. However, the company he represented assumed those rights, and filed a bill in Chancery against some of the calico-printers upon the banks of the stream,

whose works tainted the water. The usual consequence followed; an injunction was granted for a time that the issue might be tried. The parties against whom they proceeded had a verdict recorded against them. It was found, however, that this did not operate upon the other millers on the stream. They did not, in consequence of the verdict recorded against one of their body, cease to pollute the stream; and, so late as the last assizes for the county of Chester and Lancaster, the old Stockport company were obliged to bring an action against the proprietors of the Dinting Vale Works, which belonged to Messrs. Potter, who were printers in a very large way of business. That action was tried before Baron Channel; and, on reading the report of the proceedings, it would be found that the horrors detailed in evidence, on the part of the plaintiffs, were perfectly astounding. It was quite frightful to think that the water, with which the people there were supplied, was so tainted and polluted as the old company represented. Dr. Lyon Playfair, a gentleman of great scientific eminence, who was examined on the occasion, said that, on taking out one pound of mud from the neighbourhood of the works at the bed of the river, he found in that pound of mud five grains of arsenic—two grains being sufficient to destroy human life. Upon that trial, as might be expected, a verdict for the plaintiffs, the old Stockport company, against Messrs. Potter was returned. But the nature of the cause did not promise that this litigation would put an end to the nuisance, and he (Sir W. Alexander) was not therefore surprised to learn that, on the first day of the term just gone by, a motion was made by Messrs. Potter, and a rule *nisi* obtained for a new trial upon various points which had been suggested. To show that that action would not have the effect of removing the nuisances of the stream, and, therefore, that this company could not rely upon that for the purity of the water, he (Sir W. Alexander) might mention that two actions were tried at York last year, and the only thing likely to flow from those proceedings taken by the company was an uninterrupted stream of litigation, and not of pure water! His lordship summed up for four hours —that was not an unimportant consideration to begin with—and submitted several questions relating to matters of fact for the jury, but all points of law were to be reserved for the court above. The matters of fact which his lordship submitted to the jury, amounted to no less than ten. Now the committee would see from these various issues of fact, to say nothing of all the questions of law which were behind them, that this would be an interminable matter of litigation, and offered no remedy to the town of Stockport, the inhabitants of which were suffering from the polluted water from which their supply was altogether derived. The result of those cases was, as he had stated, a verdict for the plaintiff, with the right to try the issues, 40s. damages, and all points were reserved for further consideration. Supposing that these causes were at once disposed of in the most favourable way to the company, still there would be nearly ninety others polluting the water; and, supposing that these, also, should come to be restrained, there would still be the enormous population living upon the banks of the river, whose ordinary pollutions of sewers, drains, and all the incidents of a large population, would flow into the river; so that, in fact, there was nothing for it, but that this dangerous source of supply should be abandoned by the old company. The evidence given on these trials by their own witnesses showed the opinion of the old company—who were petitioners against the present bill—of the unadvisability of continuing the river as a source of supply. There had been a number of public works erected, with the sanction of the Legislature, upon the river Goyt. There were three large reservoirs for the supply of water to the Macclesfield Canal. That caused, therefore, an abstraction of water to a considerable extent; and the committee must recollect that, when a stream was polluted, the abstraction of any quantity of water from it was of much more importance than when it was left pure, because, the greater the quantity of water, the more it was diluted, and the less the noxious matters affected it. Then, there was the Glossop reservoir, which was established under the authority of an Act of Parliament, for the purpose of supplying compensation water to certain millowners; and that water, after serving the purpose of those millowners, was discharged again into the Glossop brook, and found its way, consequently, to the Etherow; but then it passed through the polluted part of the Etherow, and, of course, became tainted in its passage. Finally, there were the large Manchester Water-Works, which were constructed by authority of an Act of Parliament, for supplying Manchester and Salford. But, besides these works, in the nature of reservoirs—which, of course, created a very large diminution of the stream of the river Etherow—there were 91 manufactories and 13 print-works; and the population upon the banks of these streams, which were the sole sources of the old Stockport company's supply, amounted to about 64,000 persons. The Manchester Water-Works were of recent construction—1848 or 1849—under the Act of 10th and 11th Vict., cap. 203, which obtained the royal assent on the 9th of July, 1847. That was an Act to enable the corporation of the borough of Manchester to construct works for the supply of the borough with water. By the 46th section of that Act, it was enacted that the corporation of Manchester should be required to discharge, out of the company's reservoir, for the purpose of giving compensation to the millowners for the erection of the reservoir, 62 cubic feet per second. Then, there was an Amendment Act, of the 11th and 12th Victoria, which obtained the royal assent on the 22nd of July, 1848; and, by the 12th section of that Act, the quantity of water which was to be discharged out of the compensation-reservoir was altered from 62 feet per second to 75 feet for twelve hours of every working day. This was a very large quantity, and would amount to about 20,250,000 gallons per day. Then, there were some other Acts bearing on this point. They would find that the Act of 1854, the 17th Vict., cap. 38, contained a clause reciting that it was expedient that the corporation of Manchester should be authorized by agreement to reduce the amount; and the 28th clause enacted that, in the event of any failure to discharge the water prescribed by the Acts of 1847 and 1848, as compensation, the parties entitled to the water are authorized to sue the corporation for penalties equivalent to any undischarged, not being less than 55 cubic feet per second, as may be agreed upon, and such agreement to be binding; and the corporation were not to be under any obligation whatever to discharge more than the reduced quantity which would be so from time to time agreed upon. In the first place, they were obliged to discharge 62 feet per second; that was afterwards increased to 75, and this last Act authorized the corporation to agree for reducing it to 55, but that was to be the minimum rate. That was the result of legislation on the subject. This showed that the corporation wanted to have as large a supply of water as they could, and that they were very much indisposed to give the 75 cubic feet per second according to the legislation of 1848. Now, he believed that they should be able to show, though he thought it was sufficiently obvious, that the Manchester corporation found themselves running short of water, and that the burden of discharging 75 cubic feet per second was too great for them to bear; therefore, they obtained this enactment, the effect of which was that the various persons (and among them the old Stockport Water-Works Company) came to an agreement with the corporation, by which they positively received from the corporation of Manchester, compensation for agreeing to reduce it to 55 cubic feet per second—compensation in money amounting to £2000—an annuity equivalent to the value of £2000; so that they sold their right for good hard cash to the corporation of Manchester. Now, that proved two things; first, that the Manchester corporation were most anxious, even at that cost, to retain the water; and, secondly, that the old Stockport Water-Works Company were so indifferent to the supply that they parted with their right to that portion of it. That was in 1854. Now, those 20 cubic feet per second, would have done something towards diminishing the effects of the foul matter which had found its way to the sources of supply. It was under these circumstances, therefore, that the present new scheme was started. It had been suggested, over and over again, that some fresh source of supply should be provided. Complaints were rife; the inhabitants of the town of Stockport resorted to the pumps for the water they drank, and he understood the state of affairs was such, that water was brought about and sold in carts for the purpose of drinking—the old water-works company supplying water principally for the purposes of washing. This gave rise to the present scheme, which he was now going to describe to the committee.

Mr. RUSSELL asked if the water had been carried about in carts, and sold, since 1854?

Sir W. ALEXANDER said he was told that it was done at the present moment. He did not know whether it had been so before 1854. The proposed source of supply was Lyme Park. There were three large reservoirs to be erected, two of which were connected with each other, and the third was connected with those two by means of a fork-line from the main-pipe, which was united to the other very near the point of crossing the railway. At Norbury, it was proposed to have some filtering-beds, for the purpose of giving additional purity to the water, and from thence it would be transmitted to a place of considerable elevation above Stockport, so that the town would be supplied, by the force of gravitation, on the most approved plan. Now, the gathering-ground was a lofty range of hills, partly above and partly within Lyme Park, and it would be occupied altogether as pasture or park-ground, and was at considerable altitude. Inasmuch as there was no land of any considerable elevation in a westerly direction from Lyme Park, it was calculated that the rainfall would be deposited in large quantities upon those elevated positions; and, from the nature of the geological formation, it was believed that the water would be—as it was, indeed, proved that it must be—of remarkably pure and soft quality, and adapted for the purposes for which it was intended. There were to be three reservoirs, capable of holding 219 million gallons—that was their storeage capacity. Then, from those reservoirs the water would be conducted by the main to Norbury. The pipes would be laid under the turnpike-road, and be carried to the service-reservoir, and from thence the water could be conducted to the highest building in Stockport. The distance altogether would be six miles and five furlongs of main, and the remainder of the works would simply consist of various branch-pipes. The works, the committee would see, were perfectly simple, and did not differ at all from the works ordinarily constructed. They were, no doubt, aware of the altitude of the buildings to be supplied; and those buildings, without any other agency, would be supplied with water by the force of gravitation. Now, the area of the rainfall would be 1667 acres, and, in that district, there were the peculiar circumstances which he had mentioned—viz., lofty elevation, and no high ground near. The next question was the purity of the water—and he believed that would be undisputed. It had been submitted to analysis, and eminent chemists had pronounced in favour of it; and, he believed also, geologists were in favour of it, for even in 1846, when the Manchester corporation scheme, for supplying Manchester with water, before the Act of 1847, was passed, attention was attracted to Lyme Park as a source of supply; and, though they eventually resorted to the river Etherow for supply, it was not because the water in Lyme Park was not pure. He believed it was stated, then, that Lyme Park would, at some future day, afford a good supply for Stockport, the population of which was then rather small. Even then, they were of opinion that Lyme Park ought to be favourably considered. Again, he found that, in 1854, the plans were deposited by an intended company, for the purpose of supplying water from Lyme Park, but financial difficulties followed upon the Russian war, and the scheme was not proceeded with. Mr. Leigh, having had his attention drawn to the position in which Stockport was placed, hearing of the universal condemnation of the Stockport water, and finding that the old company had no sources of supply except the river from which they pumped the water, felt that, some day or other, he should be placed in the position of being obliged to make use of the water of Lyme Park, or that he should have the competition of a company there, perhaps hostile to his views. He considered it wise to place himself at the head of a revolution, and he then put forward a scheme for the purpose of supplying the water from a source which he felt would, sooner or later, be taken against his will, if he did not propose to take it himself. The old company having refused to undertake the matter, plans were produced upon the subject; and, after consideration was given to these plans, having approved of them, and finding that this was really the fittest source of supply, Mr. Leigh determined at once to organize a company, and he, therefore, put forward these plans in order to assist his neighbours to obtain this source of supply, and, at the same time, believing that if he had control over the manner of executing the works, he should be protected in the enjoyment of his property. He would be ready to concede to the public the right of drawing water from the reservoir; but he thought it right to keep his control over it by constituting himself a director of the company. When this bill received the sanction of Parliament, he would be ready to let others into the company. He merely wished as director to see that the works were carried out, not only according to his own judgment, but for his own supply. He (Sir W. Alexander) made these remarks because it would be said by some persons that this was not a *bonâ fide* undertaking, that the persons representing the company were not connected with the neighbourhood, and that, altogether, there was no reliance to be placed upon the scheme being carried into execution. He thought that when a gentleman, with an income of £30,000 or £40,000 a year, undertook a thing of this kind, and had associated with him such gentlemen as Mr. Mercer (who managed his property), and Mr. Venn, confidence might be placed upon his *bonâ fide* undertaking; £80,000 would be perfectly sufficient for the whole of these works. He should not have thought it necessary to say so much upon the subject if the petitions had not stated that it was not a *bonâ fide* undertaking. It was a *bonâ fide* undertaking, put forth by the persons mentioned in the bill, for the well-being of the neighbourhood. He might as well state that the estimate of £80,000 would be verified by Mr. Simpson, the engineer of the proposed company, and confirmed by others Mr. Simpson was a gentleman of large experience, having laid down works in various parts of the kingdom. Mr. Bateman had had his attention directed to Lyme Park before, when considering the Manchester scheme, and he would be prepared to say that the estimate would be sufficient. It was said that the old company talked of some agreement with the Manchester water-works committee, by which they could obtain a supply from the reservoir of the Manchester corporation. It would be seen what the nature of that agreement was. It might be a sufficient answer to that agreement to mention that the Manchester corporation had not any water to spare, as the

committee would see by the Act of 1854. In 1860, the corporation of Manchester brought in a bill to reduce the amount of compensation-water below 55 cubic feet, but were unsuccessful. The next subject to which he would draw the attention of the committee was the petitions against the bill. Now, the first petition he had to mention was one from the trustees of the turnpike roads. They went into a number of allegations in their petition, and one was certainly of an extraordinary nature. It led him to suppose that the trustees did not live in the town, for they said there was no want of water, and no public benefit would be gained by the establishment of a new company. Now, if they meant to confine themselves to that allegation, perhaps the committee might conclude that there was no want of water, but that there might be a difference in quality. They did not appear by counsel; and, he supposed, they petitioned only with reference to laying down the pipes and repairing them. The next petitions were from gentlemen who complained of the proposed scheme, on the ground that the water supply which they now enjoyed would be taken from them thereby. But the promoters did not intend to take the water from ground lower than Park Gate; and, of course, there was no fear of their interfering with any water that fell into the brook lower down. These parties, then, who petitioned against the bill, were left in the possession of very large acreage ground for draining purposes. If the water were taken lower down the stream, it would not be at a sufficient elevation to enable them to supply the highest parts of Stockport. The reservoirs to be constructed would extend over 16½ acres, and contain 219 million gallons, which would afford a supply for one hundred and eighty-three days, assuming the population to be 60,000, at 20 gallons per head per day; or a supply of one hundred and fifty days for a prospective population of 80,000, supposing it rose to that. He (Sir W. Alexander) should have said that the corporation of Stockport were in favour of the bill, and had presented a petition to that effect; and they were very anxious that the bill should be passed. The corporation were satisfied that this change was required for the benefit of the town; for it was impossible that things could be allowed to continue as they were. The committee ought not to suppose that the millowners, who were petitioning against this bill, were dependent solely upon the comparatively small amount of water which would be taken from them. It was provided by the Water-Works Act that millowners should have compensation for damage; and in this case, though they would not receive quite so much water as before, they would still have an ample supply for all their wants. It was enacted by the general Act that where by a special power companies should be empowered to take any stream, they should, in exercise of the powers so given to them, be subject to the provisions and restrictions contained in that Act; and, if in England or Ireland, subject to the provisions of the Act of 1845, and should render full compensation for all damage done, and the amount of such compensation should be determined in the manner provided by the Lands Clauses Consolidation Act. That put them upon the same footing as persons whose land was taken for public purposes. They were authorized to obtain full compensation, and thereby were guarded from any possibility of danger or loss if the measure were carried. The Lands Clauses Consolidation Act was perhaps the only part of our law which could be called a code. The remaining petition against the bill was that presented by the old company. They said they were now supplying water to the town, and had, from time to time, supplied an increased number of houses; that they had expended a large sum of money for affording a supply of pure and wholesome water to any extent that might be required. He (Sir W. Alexander) had already mentioned to the committee the trial, in which it was proved that the supply of water was bad and unwholesome. They now said that no complaints had been made in the district, either as to the quality or quantity. Why, the complaints were innumerable. They went on to say that they believed the present bill to be of the most speculative character, and the promoters were non-residents in the borough of Stockport. What was that? He (Sir W. Alexander) believed that some of the greatest public works in the kingdom were made in different localities by persons not residing in those localities. If capital was to be limited in its exercise to a particular part of the country, many of the greatest works would be left undone. But the allegation was not true, inasmuch as Mr. Leigh was a resident within ten miles of the place proposed to be supplied. The petition continued to say that, so far as the district of Stockport was concerned, there was no necessity for establishing a new water company. The petitioners altogether denied the truth of the preamble of the bill, and stated that the public interests would not be promoted by giving power to an irresponsible body. The fact was, that if Parliament gave powers the responsibility would be fixed. The petition also asserted that no better source could be obtained than that by which the borough was at present supplied. He (Sir W. Alexander) undertook to show that it was impossible that the present company could produce good water from the present source of supply. Then, there were generalities, stereotyped in every petition. This was the last petition against the bill. Now, the promoters of the present bill did not seek to establish a monopoly. He thought that the old company might continue to exist by their side. It was proved by themselves that they had bad water, and the two litigations proved it most incontestably; but they might still continue to supply water for washing, while the new company could supply it for drinking. It was quite probable that they might be able to supply some also for drinking. The new company did not seek a monopoly. The old company could, however, have no source of supply that was pure. There was certainly a rumour of their making a bargain with the Manchester company for the supply of water, but the committee had been already shown that there was very little probability of the Manchester corporation being able to spare any water. They had gone on from year to year trying to reduce the amount of water which they were bound to pay by way of compensation to the millowners, who were great sticklers for privileges, and there was not the slightest probability either that the river would be pure. These were the circumstances of the case which he had to lay before the committee, and he would only say, in conclusion, that he thought the claims of the millowners would be satisfied, and they would find their apprehensions groundless.

FRIDAY, MAY 10.

Sir W. ALEXANDER said he was anxious to explain a mistake in his description yesterday of the drainage area. One of the portions of ground which had been calculated at 2300 acres, contained only 1800; and, therefore, the extent of drainage ground which would be left to the different millowners, and to Colonel Davenport, after taking away the 1667 acres required for the new water-works, would not be so large by 500 acres as he had represented. There was also another point. He had stated yesterday that the Manchester water-works committee had obtained power to reduce the amount of compensation payable to certain parties to 55 cubic feet per second, and that they had endeavoured to obtain a bill subsequently to reduce the amount still further. His learned friend, Mr. Johnson, had stated that he was mistaken, and he (Sir W. Alexander) had replied, that he had strong reason to believe he was correct. He now found he had made a mistake upon the subject. He had the bill which was introduced by the corporation of Manchester last year, and he found that the preamble of that bill was a recital of the 28th section of the Act of 1854. That was followed by the 14th clause, stating that, out of the moneys they were empowered to raise, they were to pay such an amount of compensation for reducing it to 55 feet as agreed upon. That clause was struck out of the bill. He found that they did not seek to reduce the amount below 55, as he had stated to be the case.

Mr. *John Lowe*, examined by Sir W. ALEXANDER.

I am a surveyor in Manchester. I have been engaged for the last five-and-twenty years in taking surveys in the neighbourhood of Stockport. I have, consequently, an extensive acquaintance with the district. I have been engaged as surveyor for many of the lines of railway constructed through that district, and they are pretty numerous; and that has made me acquainted with the country. I know the course of the rivers Goyt and Etherow, and the different streams that flow into those two rivers. I have examined the Ordnance map, showing the course of those streams in reference to the various manufacturing establishments along their banks, and I believe it to be correct. The schedule attached to the map correctly describes the manufacturing establishments. They consist of bleach and print-works, cotton manufactories, and paper manufactories. That is a general description of them. I have recently visited the place for the purpose of verifying the plan. The discharges from the print-works are great, and of a very deleterious nature. They are of a dark colour; some of them as brown as the paper on the walls of this committee-room. Some of the works are on an extensive scale, and, of course, the discharge is proportionate. The Etherow takes its rise among the hills between Yorkshire and Derbyshire, and flows westward; and it is from the river Etherow that the inhabitants of Manchester are supplied with water. The distance from the source to the foot of the Manchester Corporation Water-Works is seven miles. The distance from the junction of the Etherow with the Goyt to Stringer's Weir is about five miles. The population of the district, according to 1851, was 48,217; it is now about 60,000.

Cross-examined by Sir F. SLADE: I know Colonel Davenport's place at Bramhall. It is a very beautiful old mansion—one of the finest in the county. I know Bramhall Brook runs through the estate, and through the park. [The witness pointed out to to the chairman on the map the course of the brook through the estate.] The substantial part of the brook comes from Lyme Park. The brook runs within a couple of hundred yards of the mansion, and it adds beauty to the scenery. It is a brook of considerable volume, being about 12 feet wide, and about one foot deep. Red-Acre Brook is a tributary of the Bramhall Brook. I do not know what water the proposed company mean to take from it.

Cross-examined by Serjeant WHEELER: I know Mr. Jowett's works near Cheadle. They are very extensive. I know also Mr. Bostock's mills near Cheadle. Those are works of considerable size. The Bramhall Brook and the Paynton Brook take their rise in Lyme Park, running down from Mr. Ferrio's, and from there to Mr. Bostock's and Mr. Jowett's mills. The Red-Acre is a small brook at Paynton, but it gets larger as it goes down. Between the point where it takes its rise, and the Macclesfield canal, it is a very good stream. I should think it is similar to the other which comes from the park. I do not know the quality of the water. They both go to Bramhall. They join about a mile and a half above Bramhall, and both come from Lyme Park. [Several large photographs of Bramhall were handed to the witness.] These photographs afford correct views of the estate of Bramhall. The entire drainage of Lyme Park goes into those brooks. I do not mean the sewers—there are no sewers in Lyme Park. I mean the rainfall, not the sewerage of houses.

Re-examined by Sir W. ALEXANDER: The Red-Acre Brook runs in a westerly direction, and falls into the Paynton Brook—or, at any rate, one flows into the other. They form a good volume together. There is no portion of the Paynton Brook, or Red-Acre Brook, drawn into the intended water-works.

Mr. KER inquired if the photographs were to become the property of the committee? He thought they ought to be impounded.

Sir F. SLADE said he should be happy to supply the honourable member with one on condition that the committee should throw out the bill.

Re-examination continued: The other mills lie lower down, and they will have all the water from the Paynton and Red-Acre Brooks. In my judgment, the volume of the stream would not be altered materially by the establishment of the proposed company.

Mr. RUSSELL: But there will be water abstracted from it?

Witness: Yes.

Mr. RUSSELL: Then, how can you say the stream will be the same?

Witness: It will be pretty nearly the same, though, of course, not containing the same amount of water.

Sir W. ALEXANDER: There will be a diminution of 1667 acres of drainage, but no more than that.

Edward Walmsley, Esq., examined by Sir W. ALEXANDER.

I am the Mayor of Stockport, and I am engaged in a cotton manufactory in that town. It is a manufacturing town, and the population is composed principally of persons employed in the cotton trade. The present population of the town is about 55,000; but the district, intended to be supplied with water, comprises a larger number of persons. I have lived in Stockport all my life, and I am well acquainted with the town and population. I have paid attention to the sanitary condition of the people there. I have been upon the sanitary commission for years. It is true that Stockport had been supplied for years past by the old water company. The quality of that water was inferior. The whole of that supply is obtained from the river Goyt. The houses have thickened round the place whence they draw the supply. The river Goyt and its different tributaries flow through a large population, and there are a number of paper-works and other manufactories situated upon the banks of the streams. The discharge from print-works and manufactories flow into the source of supply. I live just outside the borough, but my business is situated within the borough. I do not allow it to be used for drinking purposes for my own family. I have a very good pump, and I can get a better supply from that. In point of fact, I resort to my own pump, and do not employ the water supplied by the company for drinking or cooking purposes. I employ about 200 hands in my mill. We have no other water for them to drink than the old company's water. I have complaints from them of the quality of the water; it soils the washhand basin, and the basin has sometimes to be washed out with hot water. The sediment comes entirely from the water supplied by the old company. The attention of the corporation has been turned towards obtaining a more effectual supply, but hitherto no very active steps have been taken. As to the pressure—the water only comes to the third story of my mill, though my mill is six stories high. It is situated on the north side of the borough. Having had conversations and discussions upon the necessity of a purer supply of water, I believe the water of Lyme Park to be of good and pure quality. There are no manufactories existing above the place where the water runs into the reservoir, and I think it is very unlikely that there will be. The elevation of the ground is considerable, and that would be an objection to having mills,

Supposing the water in Lyme Park to be taken for the purposes of the company, there would be no probability of its being interfered with. I should not think it would be. The scheme of the new bill has been submitted to the corporation of Stockport, and they have asked to have certain clauses inserted protecting the public. Those clauses were readily inserted. They met on the 22nd of April last, and carried a resolution, which I have in my hand, for supporting the bill. It was unanimously carried. There are divisions in the council on some matters. They are not always unanimous. They agreed upon a petition in favour of the bill. The corporation is of course subject to the ordinary law, by which a certain number of members go out every year, and a certain proportion are re-elected; and therefore I am of opinion that the bill would be advantageous to the public. I have long been of opinion that the present quality is bad.

Cross-examined by Sir F. SLADE: There was a great difference of opinion upon some points, but not upon sending the petition in favour of the bill. I do not know that it was stated that the Lyme Park water was no better than the present. There was a statement made that the water at Lyme Park was not so good as might be got. I know a gentleman of the name of Marsland, the member for Stockport. He said at that meeting, that the Lyme Park water was not so good as that at Manchester, and he would defy any one to prove it. It was stated there that the water of the present company was only rendered bad by the throwing in of the printer's colours. It was also said that that would be stopped by actions at law. The case decided, as far as it has gone, has been in favour of the company. I am well acquainted with Lyme Park.

Cross-examined by Mr. WEBSTER: The corporation of Stockport sent a petition on the 2nd of March. The Mr. Marsland whom I have mentioned is a large proprietor of the old water-works company. There were two petitions prepared. The second was presented on the 25th of April. I am not a promoter of the scheme. I do not know any person who is as a shareholder. I do not know Mr. Robert Russell, of Leadenhall Street, London. I know Mr. William Mercer. He is a land-agent for Mr. Leigh, the proprietor of Lyme Park. I do not know Mr. Thomas Payne, of Salisbury. There is another gentleman, I believe Mr. Leigh's doctor, in the concern. It was on the 22nd of April when this difference of opinion was expressed about the quality of the water. We have a good deal of water from the river for watering the streets. I do not recollect the quantity we have from the company. At the public baths, we have what we require. I do not know the price. We have it for the court-house and the market. I do not know the amount. I do not know whether the average rate is 4½d. per 1000 gallons. I have not been on those committees which manage these matters. I do not know that the rate is very low. It may be low comparatively to other towns. I took no steps with the corporation to make an alteration before these gentlemen came to us with their scheme. I am not aware that there was anything said to the old company about selling their works when this bill was proposed. The corporation, at first, declared by petition that it would be impolitic to supply the district. We have three or four fountains in the town supplied by the water company. I have a very good pump in my premises, and do not want the water of the company. My works are in a high part of the town. There has been no change in the mode of drawing water from Stringer's Weir for many years. I could not speak of the points of law involved in the trials, but I know that the company have succeeded in their lawsuits at present; but, from what I saw yesterday in the borough, there had been no improvement. I use the water at my own mill. My hands complain of it. The corporation do not drink the water. I am on the sanitary commission, and charged with seeing to such matters. I am not aware that the town council have made any complaint by way of resolution. The drinking fountains have been only lately erected. Till these gentlemen came down from London, or Wiltshire, or wherever it was, the corporation never took any step to make a change in the state of the water. I do not know that they did so officially. I know we have talked it over. If they could get a better quality of water from the Manchester corporation than from Lyme Park, no doubt they would take it. I cannot say chemically the Lyme Park water is as good as the other, but I should think it was as good. We should not care where the water came from. There is an intention on the part of of the old company to derive their supply from the Manchester water-works from the Etherow. I have heard of it for many years. I do not know that there is a greater probability of it now than before. I have heard, within the last month, of their intention of doing so.

Mr. CRUM EWING: Is the Manchester reservoir full?

Witness: I do not know. There has been great alarm at different times, at Stockport, whether the reservoir would not break down, and deluge it. I believe they have been going to get a bill for a new reservoir.

Cross-examined by Serjeant WHEELER: We have had a discussion only amongst ourselves; not with the promoters of the bill. We have had conversations with Mr. Marsland, for instance, and so on.

Re-examined by Sir W. ALEXANDER: It is not an unusual thing for the corporation of a town to be owners, or to have the management of water-works. It is so in Manchester. That is nothing very startling. The fact is, we have debated the question ourselves, whether it would be most proper to get an Act ourselves, by starting a bill. Mr. Marsland is a large proprietor in the old water-works company, and he is the son of Peter Marsland, who originated the old company. The Messrs. Marsland having high positions in the borough, I have no doubt that their position has weighed very much with every member of the corporation, in inducing them to withhold their complaints. Mr. Marsland did not divide the council on the petition in favour of the bill. A petition was drawn up opposing the bill, on the 22nd of March. It was complained that no proper provision was made by the bill for the supply of water in large quantities, or to fix the price of the water, and it was to pray that the bill might not pass into a law. Those matters were altered, and it was decided that a petition should be sent in favour of the bill, which was done on the 22nd of April, and the corporation were unanimous upon it. I know persons who are shareholders—Mr. Leigh, the owner of large property at Lyme Park, and a very large estate besides. He is one of the members of the southern division of Lancashire, and is well known as Mr. Leigh, of Lyme. There are persons in the borough of Stockport anxious to promote the bill, though they are not shareholders. There is a great feeling in favour of a good supply of water, and this is the first company who have proposed to amend the present state of things. I do not know whether the water which supplies the fountains is paid for, or gratuitously given. I think it is possible that it is supplied gratuitously. Since the bill has been before the House, there has been a fresh talk about resorting to the Manchester corporation for a supply. It has been more distinctly brought before us since that time. It has been in abeyance all along. This is the first measure that goes to assist us with better water. I am aware of the actions that took place by the company against the millowners, and I know that the evidence went to show the bad state of the water.

Serjeant WHEELER objected to the re-examination on this point.

Sir W. ALEXANDER said he should object, in that case, to Serjeant Wheeler's being heard at all on the matter. Mr. Webster having put certain questions in cross-examination of the witness, it was his duty to have set right the effect of those questions in re-examination. His learned friend, Serjeant Wheeler, who was not responsible for the examination of Mr. Webster, now rose to set him right. Was that fair? Certainly, every person ought to be confined to his own department. Serjeant Wheeler had no right to object, though Mr. Webster might. Surely, they were not to have volunteers rising to assist the old proprietors—persons who appeared upon different grounds and different petitions. The question of Mr. Webster was, "Are you not aware, by recent trials, that the old company have been trying to prevent the millowners from polluting the stream?" And now he (Sir W. Alexander) contended that he had a right to ask upon that, in re-examination, whether the company, in those trials, did not prove that the water was much deteriorated? He would simply ask, has the result of those actions been an improvement in the quality of the water?

Witness: Certainly not; it was very bad yesterday, and I have no doubt it was as bad as ever. I did not taste it, but I saw it in the fountains.

Mr. *Eskrigge*, examined by Mr. RODWELL.

I carry on business as a cotton-spinner, and have done so for about eighteen years. I am a member of the town council, and chairman of the general committee. I am well acquainted with the town and surrounding district. In my individual capacity, my attention has been of late directed to the water. Of late, more especially during the last six months, the quality of the water has generally been a subject of conversation. Now, from my own knowledge, the water has been bad in quality, and unfit for the purposes for which it was required. I do not drink it myself. I do not use it myself at all. I use spring water in my establishment. I know from intercourse with my neighbours and others living in Stockport that they will not drink it, and do not use it for domestic purposes where they can get anything else. I know the course of the river Goyt, and I know the streams, many of them, which contribute to it. They run through a district which is thickly populated, and increasing in population. There are many manufacturing establishments of different kinds on the banks, bleach and dye-works, and print-works, and paper-works. In their various processes, they are obliged to use various noxious preparations. They must do so. There are some chemical-works on the railways. As a matter of fact, the discharge from these different mills and factories into the water does pollute it very much. It is evident to the eye as well as to the taste. To ascertain the bad quality, you need not taste it. I know by the report in the newspapers of the trial that took place at Chester. It was in April of this year. No improvement of any sort has taken place as far as my knowledge goes. I have seen the water both before and since, and I cannot see any perceptible difference. At all events, I have not used it myself since. The complaints regarding the water are not confined to one part of the town, but generally through the town. It presses of course harder upon the poorer than the richer classes of the community. The poorer classes get water sometimes from pumps, and when they have got out of repair they have petitioned the corporation to put them in repair. I have heard the price named for carying the water in carts. That water is spring water supplied from the pumps. I know the point where the river is drawn off for the supply of the town. That is close to the town. Independently of the effect which these calico and other works have upon the stream, I think it would be unfit for use, from the drainage of the offensive matter which must necessarily arise where there is a large population. Under the circumstances, I think it is an absolute necessity that there should be a better supply for Stockport obtained. I know of the proposed scheme for supplying the town from Lyme Park. As a member of the town council, I have taken an active part in the bringing in of this bill. I know Lyme Park. It is a large extent of pasture-land. I have myself examined the site of the proposed works, and, from my own inquiries, I think that it is a proper place, and the only one that Stockport can possibly have for supplying the town with water. I cannot give any information as to the gathering-ground. I know it is several hundred acres. I should say there is no prospect that Lyme Park, which is now the property of Mr. Leigh, should at any time become building-ground, or that any population should rise in that place. It is an old family estate. If it were possible to convert it into building-land, the district is not adapted for manufactories; therefore, there is no probability, in time to come, of a similar pollution of the water as that in the case of the present source of supply. I do not wish to express anything hostile to the old company, but I come here, on public grounds, to express an opinion of the necessity of having a better supply. I know that, when the petition against the company was withdrawn, and the proposed company acceded to the views of the town council, it was received with very great approbation. There was great dissatisfaction expressed, in the first instance, at the corporation opposing the bill. The dissatisfaction expressed by the council was not against the bill on the necessity for a fresh source of supply, but against certain clauses. We feel satisfied that, if the parties get their bill, we shall have a better supply of water. We have no fear of that. The old company have taken no steps, within my knowledge, for improving the water supply. I think it is very probable I should have heard if there had been any taken. It would be very strange if I had not heard. It was said, some time ago, that the water company of Stockport was in treaty with the Manchester corporation. I first heard of it on the promotion of this bill. I think, until the new company took steps for getting a bill, there were no steps taken by the old company for improving the supply. The water supply of the Goyt is yearly diminishing. The supply has diminished of late years. As an instance, in my own manufactories, the water used to come against the wall, but now, with the exception of a most extraordinary flood, it does not come within 15 or 16 yards. The water company received compensation in money for the subtraction of the water. I think they received £2000 or £3000. As a member of the town council, I do not know that the corporation expressed their readiness to take the matter into their own hands. They wished to have certain power over the water. In the negotiations which took place between myself and the promoters of this bill, it was stated that the necessity of having a better supply was so urgent that the corporation would have to move in it themselves.

Cross-examined by Sir F. SLADE: I have not given any money towards this bill; I do not know that any other members of the town council have pledged their money or their pockets to support the undertaking. I do not know anybody, besides the doctor of Mr. Leigh of Lyme, who has. With that solitary exception, Stockport is free from any risk. I said the old company had not taken any steps; the town council have not interfered at all; we have no power. In point of fact, no notice was given to them of the impure state of the water. I do not say that individuals have not, but not the corporation as a body. I have not myself represented it to the water company. I did not lead the attack against the old company. I did not move the resolution deprecating a company which had done so much good for Stockport. It was my opinion that the old company had done a great deal of good for Stockport. I am a manufacturer myself. If I throw anything into the river, it is below the reservoir. I throw cinders in. At a meeting that was held upon the subject by the council, Mr. Alderman Rayner said the present water-works company

had power to obtain water from Manchester, and had better do it, instead of bringing a new company into the town, which had been got up, he believed, for the purpose of putting a few pounds into the pockets of the lawyers. I know Colonel Davenport's; I have been there. In my judgment, it would materially alter the beauty of the grounds if the body of water in the brook were lessened.

Cross-examined by Mr. JOHNSON: I have been in business at Stockport for seven years; I reside within the borough, within about a mile and a half of my own mill. I am a member of the town council, and have been so for five years. I have had this question of the water supply especially under my notice for some time past; the council consists of various committees. I have attended the meetings of the committee upon this subject. The town-clerk prepared a petition with my assistance. I am aware of the difference between praying against the preamble and paying against the clauses of a bill. The clerk is in favour of the bill. I had an interview with the Parliamentary agent when I came up as one of a deputation. Nothing was said to me as to who the promoters were. I only knew from the prospectus. I did not make any inquiry then as to who they were. I presented a petition in the name of the corporation against certain clauses of the bill. There was no revulsion of feeling to cause me to draw a petition afterwards in favour of the bill. The matter was put into the hands of our town-clerk, and certain amendments proposed to be made. The town-clerk communicated these proposed amendments to the promoters, and asked for an early reply as to whether they would consent to those alterations. We did not get a reply for some time. The town-clerk pressed for a reply, and said the council were not willing to damage the bill if they could get the alterations made. We communicated through the town-clerk's parliamentary agent with the promoters, and they came down to Stockport, and we had an inverview with them. Certain terms were come to upon that interview, and subsequently the corporation agreed to support the bill. There is at present no other source of supply than the old company's water, which is of a bad quality. I do not know that a complaint book is kept at the office of the company. I have never made any complaint myself, but I believe it is usual to send papers round to say that a book is kept at the office.

Re-examined by Mr. RODWELL: After the first petition was signed, we negotiated with the agent of the promoters of the bill. In consequence of the interviews and correspondence which took place, and of the alterations being adopted, instead of opposing certain clauses of the bill, we became parties to the bill. Being acquainted with Mr. Leigh and his resources, I have no doubt that, if this bill is carried, we shall have a better supply of water for the town of Stockport. Alderman Rayner, who opposed the establishment of a new company, is interested largely, I believe, in the old company. His brother, a physician, has 30 shares, Mrs. Rayner, his late brother's widow, has 100, and the young gentleman's name is down for 50. After all the discussion which took place, none of the town council voted against the adoption of the petition in favour of this bill.

Mr. *John Whitaker*, examined by Mr. RODWELL.

I am the borough surveyor of Stockport. I was formerly assistant for twelve years before I became surveyor myself. In my capacity of borough surveyor, I was in conjunction with the other members of the corporation, formed into a committee to ascertain the state of the river and the tributary streams, that is to say, the streams from which the town of Stockport is supplied with water. I first made an investigation on the 5th of March in the present year. About the spring of this year, it was notorious at Stockport that an action was to be tried at Chester, with reference to the pollution of the stream. I have heard the evidence of the two last witnesses with reference to the state of the river, and I am able to confirm it as to the filthy state of the water, and its unfitness for consumption. I have heard complaints, from time to time, from individuals as to bad water. [The witness then read from his report—made in conjunction with three members of the town council—statements as to the condition of the water near the various mills and manufactories, showing the nature of the pollutions from each. The witness was then examined as to his taking samples of the water, as supplied by the present company, for the purpose of sending them to eminent chemists. Some of these were taken to Mr. Roscoe, at Manchester, and others to Mr. Spencer, in London.]

By Mr. RUSSELL: When I took these samples, I did not give the parties notice beforehand.

By Sir F. SLADE: I took no sample from the public drinking fountains.

Alderman *Chapman*, examined by Mr. RODWELL.

I am one of the aldermen for the borough of Stockport, and I carry on a large business there, as draper. I have been a member of the corporation for fourteen years. I was one of the persons who accompanied Mr. Whitaker up the stream in his examination. His evidence is a fair representation of the state of things, of these mills pouring their rubbish into the stream, which, of course, pollutes the stream. I am anxious that this bill should pass, and that the promoters of it should have an opportunity of giving a better supply. I know Lyme Park, and I think, for many years to come, that will be a good place from which water may be obtained. I have not heard any proposition made for the water being altogether in the hands of the corporation. We propose to buy it wholesale—to pay so much per 1000 for the water in the bulk.

Cross-examined by Mr. SLADE: I have not used the old company's water for some time. I take an interest in matters relating to Stockport. None of the town council ever took any steps towards an improved state of water, or having a new system. There has been no public meeting called, that I know of. I do not know that there have been any representations made to the company. There is an inspector of nuisances in the town of Stockport. I am not aware that he has made any complaint of this kind. It was rather a surprise—these gentlemen coming down with their bill to the town of Stockport, because it had not been known before. I believe, there was no name attached to the parliamentary notice. I have not seen the plans, and I cannot tell whether there was any name attached to them. Three or four years ago, an attempt was made to get a supply; but it was not gone on with. I do not think the water was so bad as it is now.

Cross-examined by Mr. WEBSTER: I never heard it publicly talked of, that the old company intended bringing water from Manchester. I think, the Manchester water is good water, from what I have seen of it. I have water from the old company for the shop.

Re-examined by Mr. RODWELL: I have never heard that the old company have taken any steps for improving the condition of the water. It would have been as much a surprise to me to hear that they had done so, as it was to hear of the present bill.

Dr. *Higginbottom*, examined by Mr. RODWELL.

I am a member of the College of Surgeons. I have a large practice in Stockport. I am a member of the town council. I have practised at Stockport fifteen or sixteen years. From my intercourse with the people, and in my medical capacity on the subject of the water, I have formed an opinion that, in a sanitary point of view, it is not fit for drinking. It has been worse the last two or three years. The causes which, in my judgment, have led to the pollution of the water were the mills, and the drainage from the population. I never made any analysis of the water. I examined it with my eye, and with my tongue. It has not a very disagreeable smell; but it is the colour and taste that I dislike. I think this water would be likely to have a prejudicial effect on the health of the people. In the case of any epidemic, I think that prejudicial effect would be heightened. I think no amount of filtration would remedy it entirely, though it might improve it. In my own experience, as using water in my own house, I think the water unfit for washing purposes. I reside in the lower part of the town—the centre of the town. I have had frequently to scour the wash-hand basin, because it became so foul. From my intercourse with the people, I can say that there is a very strong feeling upon the subject of the quality of the supply. My practice brings me in contact with the lower orders in my professional capacity. The present state of things presses with greater hardship upon them, from their not having pumps, than upon the rich. They filter it themselves with flannel and muslin. In some districts, the poorer classes get water from pumps. There is a want of pressure in the supply of the present company. I had a patient who spoke to me last Friday upon the subject. He said he had made application to the present company for water, and the company could not supply it, because his premises were too high. In some districts, it is impossible to get a supply of water, in consequence of the inadequacy of pressure, the filter of the company not being high enough in the town. I have patients who complain of being unable to use it, in consequence of the insufficient pressure. My attention has been turned to the present scheme for supplying the town. I know Mr. Leigh by reputation; I know him to be a gentleman of extensive fortune.

Cross-examined by Sir F. SLADE: I have had the good fortune to stroll through Bramhall sometimes, and admired the scenery. It would certainly be much to be deprecated if the supply of water to the brooks were cut off. I have made no complaint at the office of the old company of the quality of the water supplied by them, although I knew, by the ticket left at my house, that a complaint would be attended to. I have been at the office, and have not been received in a very courteous manner; and, therefore, I had no very great temptation to make a complaint. I have complained of the conduct of the officials. I have a filter with water constantly running, and, therefore, I get it purer than it is commonly supplied. In my capacity as member of the town council, I never made any complaints. I have twenty or thirty cottages supplied by this water. I have not had them long. I do not know of any disease that might be directly attributed to the water; but indirectly there might be.

Cross-examined by Mr. WEBSTER: I never took steps to make an entry of my complaint. I cannot say how many water-carts there are in the town. I have seen one repeatedly. This project was taken up some years ago. It was never brought officially before the town council. I understood it was submitted to the then mayor; but I cannot speak positively.

Re-examined by Mr. RODWELL: Mr. Marsland and his family are connected with the old company, and they are deservedly respected in Stockport. That explains, to some extent, the want of activity upon the part of the inhabitants of Stockport. One reason perhaps was, that they were not aware of the nature of the water; but these trials that have taken place at Chester have opened the eyes of the people, and they are alive now to the necessity of having good water. I believe the statements made by the preceding witnesses were true, and not exaggerated.

Mr. *Hayes*, examined by Mr. RODWELL.

I live about two miles from Stockport, on the line of supply. There are 4978 persons. There are 678 houses. The present supply of water is only by wells to those houses. The population is increasing. I have, at present, to send about half a mile for water for drinking purposes. I have not a sufficient supply for manufacturing purposes. It is decidedly small. My attention has been directed to this bill, and I know the course of the proposed scheme. I think it would be of great benefit all along the line to Stockport. I have myself collected water from the Elmhurst Brook for the purpose of examination. From microscopic examination, I found nothing but that which I expected to find in water. Of course, if there were anything wrong, it would be muddy. In my opinion, this water is perfectly pure. I have considerable experience in microscopic observation. In my judgment, this water would be very wholesome. It is of a good taste.

Cross-examined by Sir F. SLADE: My manufactory is a silk one. I agree with all the other witnesses as to the beauty of the stream that runs through Bramhall.

By Mr. WEBSTER: I have no knowledge of the chemical nature of this water.

MONDAY, MAY 13.

Mr. *T. Spencer*, examined Mr. RODWELL.

I am an analytical and consulting chemist, living in London, and a Fellow of the Chemical Society. I am consulting chemist of the New River and other water companies, and, for a considerable time, my practice has been confined to water for the supply of towns. I have analyzed and reported on the quality of water in various parts of England in most of the gathering-grounds; and I have gone into the geological question as well as the chemical question, with reference to water generally, and with regard to the capabilities of water for the supply of towns. I have been employed very frequently in such inquiries. I was engaged by the promoters of the present bill to examine and report upon the water in Lyme Park, first looking at it, and regarding it as a gathering-ground, and, secondly, to take samples, and analyze the water. I went over Lyme Park on the 26th of April last; and, from the character of the soil, and from its being pasture, there is nothing there to interfere with the purity of the water which falls; and the springs were exceedingly pure to look at. I also took samples of water in Lyme Park; and I have them before me now. [Samples were produced.] It was deemed sufficient to take them at the outlet of the reservoirs, as that would give the average quality of the water. No. 1, from Elmhurst Brook, was 7·28 grains of solid residuum per imperial gallon. The organic matter found in the same quantity was 0·70, or about three-quarters of a grain. The hardness was 5·7°. That would be wholesome water for domestic purposes; and also a good water for washing and other purposes. Certainly, as far as this analysis goes, I know of no better water for all purposes, being surface-water. It is quite as good as can be required. No. 2, Bollinghurst Brook, taken at the outlet. On evaporation by drying, this sample yielded 8·60° of residuum. The organic matter was 0·60, or a little over half a grain. The hardness was 5·6°. That is of nearly similar character to the last; there is no practical difference. I may observe, with regard to these samples, that I tested them for nitric and phosphoric acid, which generally, in fact, indicate a high state of manure on the land; but I found an absence of any noxious or organic matter. They were well aërated. There was no smell; nor was it to be expected. Neither of those waters which I have been describing has had anything done to it since I took them. They have not even been filtered, but I put them into a much larger vessel, and the samples now produced before the committee were taken from the larger

vessel, and there was an exceedingly small deposit which one would expect being surface-water, but this was the result after standing ten hours. I decantered them after standing ten hours. I examined the state of the river Goyt where the supply of the existing company is taken. I collected samples, but I have not samples of the Goyt-water with me. I have samples of that water as it is supplied to the town taken from Nab's Pool and Stringer's Weir. The appearance of the water in the Goyt where the supply is taken before filtration, is as bad as that of any river I know of. It has an inky hue. At both these spots, the water was exceedingly turbid; in fact, the analysis shows it to be very much more so than the Thames. Looking at the water from this point, I should say that it is totally unfit for use, for, however it may be filtered afterwards, the very idea that the water was taken from such a point would certainly prevent anyone from liking to drink it. I have not a sample here in its unfiltered state. I expected there would be lots of samples from the other witnesses, and I thought it would be better not to encumber myself with them. I think there is no question that the water is exceedingly bad; but I have that which I took from the taps. When I was at Stockport, I took samples from Nab's Pool, and also from Stringer's Weir, where the water goes into a tunnel belonging to the company. I took one from the George Hotel, too. This is one [producing sample] from the George Hotel. I took this myself. I analyzed the samples from the Goyt, that is Nab's Pool, and also from Stringer's Weir. Sample No. 3, from Nab's Pool, on evaporation, was found to have 13·8 grains of solid matter, organic matter, 3·10, and to be of 6·5 degrees of hardness. I found a trace of nitric acid, but I found more phosphoric acid. The phosphoric acid was less equivocal than nitric acid. That sample is very unfavourable in comparison with the water taken from Lyme Park. I tested it at the George, and remarked that there was very much better water than I thought would have been there after looking at the river; but the landlady, who was present, said it was very much better now than it had been.

Mr. RODWELL: She wanted you to put something into it, perhaps?

Witness: From my analysis, there can be no question as to its being a bad water for town purposes. The phosphoric acid indicates the presence of organic matter—human excrements; and, from the large drainage area of the river and the population, it was so to be expected, although, having examined the Thames frequently, even when it was so bad that the attention of the House was called to it, I then did not find so much organic matter by two-thirds. I found in that a grain, whereas in this I found three grains. Nor did the water at Westminster Bridge contain phosphoric acid. In reference to Stringer's Weir, the sample, on evaporation, yielded 12·10 grains of solid residuum. Nab's Pool is a sort of subsiding point, and at Stringer's Weir the water flows in. I did not trace it, but the tunnel was pointed out to me as one belonging to the company. There was a great deal of offensive matter floating upon the top; but, looking at it in a tumbler, it was not so bad. The organic matter which I found in the sample taken from Stringer's Weir was 2·9; that is a little less than the other. The hardness was 6·5°. I found nitric and phosphoric acid. I have the sample from the George Inn. On evaporation, there were 12·4 grains of solid residuum; the organic matter was 2·5 grains; the hardness was 7·5°. This was a little harder than the others, because it had been subject to filtration. The filtration, if my analysis is correct, does not seem to have had much effect on the purity of the water, but had made it a little harder; and this was to be expected, because, I suppose, it is sand filtration, and, of course, there is always a quantity of lime and gravel—and, possibly, the company may lime the water a little—but, under any circumstances, that would account for the hardness we always find with the filtered water. Samples 3 and 4 were discoloured. At Stringer's Weir and Nab's Pool, they had a very slight inky hue. The conclusion that I draw from the analysis that I have made is, that it is very bad water. People would not thrive on it, though it does not exactly poison them. But, if better water is to be had, I should not advise them to continue the Goyt. At all events, I consider the Goyt a bad source of supply at any time. As to the water I found in Lyme Park, the result of my investigation is, that that is a good source of supply; it is excellent water, in fact. I have also examined some samples of the sandstone water. These samples were forwarded to me by Mr. Whitaker. I should have taken them myself, but I thought it unnecessary. Afterwards, however, it was deemed necessary to see what the quality of the sandstone water was, to see whether it would be eligible. I analyzed the samples purporting to be sandstone water, furnished by Mr. Whitaker, the town-surveyor of Stockport. Sample A was taken from a well at the gas-works, 14 yards deep. The hardness of this sample I found to be 49°, but it was afterwards reduced to 25° by boiling and liming. That water is not adapted for the town supply; it is too hard. It is harder than anything I know of, except in a few wells in the country. The result of my investigation agreed with the opinion I had previously formed of the character of the water coming from the sandstone in that district. In the Lyme water, there was only a small portion of organic impurity, and it was only vegetable; but, in the water that came from the Goyt, there was animal impurity indicated by the presence of phosphoric acid, which was absent from the lime. It is a very important thing, in supplying a town with water, to have it as free as you can from those acids—not because the acids in themselves are unwholesome, but because they generally have a tendency to putrefaction.

Cross-examined by Mr. JOHNSON: I am responsible for sample No. 1, which I took myself from the Elmhurst Brook; and sample No. 2, from the Bollinghurst Brook, I also took myself; and both of those were on the 26th of April last. I took from the Nab's Pool upon the same day (or, rather, I saw it taken), the sample which I have mentioned; and these samples did not leave my possession. The sample from Nab's Pool was taken from the bed of the river, and near to the spot whence the supply is derived; but I do not know what takes place there. The other sample of that water was taken also from the river itself. I have no specimens here of the water, as it subsided into the larger vessel, of which I have spoken. I cannot tell what gas-works the sample of the sandstone water was taken from. Mr. Whitaker only mentioned to me "gas-works."

Re-examined by Mr. RODWELL: I should not advise at all sinking wells, after the manner of Liverpool, because the stratifications are different. With reference to Wolverhampton, what I know of that would not suggest a well being sunk at Stockport. The quantity of water would be insufficient.

Dr. *Henry Roscoe*, examined by Mr. RODWELL.

I am professor of chemistry at Owen's College, Manchester. I have had great experience as an analytical chemist, and I have been frequently consulted in that character. I know the district and country we are talking about now, in the neighbourhood of Stockport, where these springs are. On the 26th of April, I visited the town, and went to Lyme Park with Mr. Spencer. I collected samples of water. I also took a sample from the Macclesfield Canal, and I had some specimens sent me of the water of the Goyt, collected on the Monday following, from Nab's Pool and Stringer's Weir. Those were sent me by Mr. Whitaker. I have examined the water at Lyme Park. I saw it at the time I was there. The appearance was that of good and pure water for drinking purposes. After that, I made a full analysis of it. I detected a quantity of organic and inorganic matter, and I also noticed the hardness. The results of my analysis are, of No. 1 sample—the Elmhurst Brook—was 8·85 grains in a gallon; and the quantity of organic matter, 0·9 grains per gallon. I agree with Mr. Spencer. I consider it to be a good water for the supply of the town, for general purposes. I also examined with reference to the No. 2 specimen from Bollinghurst, which is practically identical with No. 1. Those waters are free from any appreciable quantity of organic matter. The degree of hardness is also suitable.

Mr. RUSSELL: Do you think the water from 1700 acres would be sufficient for the supply of a place like Stockport?

Witness: From the quantity of water flowing in the brook, I should think so, but I have not gone far enough in my observations to say that it would. I also analyzed the water taken from Stringer's Weir and Nab's Pool, and from the George Inn, the same kinds that Mr. Spencer had. I agree generally with what he has said respecting those waters. My analyses agree very closely with his.

By Mr. KER: I tasted the water at the George Inn. It did not taste very bad; it would not poison anybody. The water from Nab's Pool was certainly discoloured by the matter which was brought down from the various works. The George Inn water is different from this, because it is filtered. The company filter it, and distribute it to the inhabitants of the town.

Cross-examined by Mr. JOHNSON: These analyses were made by me separately from Mr. Spencer. They are much the same as his. The specimens were taken on the same day, and from the same source, but the analytical results are not quite the same. They were sent to me in larger vessels, and I took quantities from them just as Mr. Spencer did. The organic matter is pretty much the same, though not invariably the same, from Nab's Pool and Stringer's Weir, as Thames water. I did not see the sample taken from the George Hotel. I found that water to contain 13·93 of solid residuum, and 3·8 of organic matter. The degree of hardness was 7·2.

Dr. *Alfred Swayne Taylor*, examined by Mr. RODWELL.

I am a professor of chemistry at Guy's Hospital, and have very considerable experience as an analytical chemist. On the 1st of May, I received two samples of the Elmhurst and Bollinghurst water. I analyzed and considered those two specimens. Elmhurst Brook gave 7·72 grains of solid matter, of which 0·8 was organic, and the hardness was about 5·7. My analyses agree as near as they would be likely to come to those made by the preceding witnesses. There was a slight taste in one—Elmhurst—of vegetable matter. No. 2 was quite tasteless. There was no smell to that that I noticed. Those waters, as I have now analyzed and considered them, I am able to say, are good and wholesome waters for the supply of the town. In August last, I made an analysis of a sample taken from the George Inn of Stockport, and another which was taken from the Goyt. They were taken at different times to the samples analyzed by the other gentlemen.

Mr. JOHNSON contended that the taking of the samples A and B had not been proved.

Mr. RODWELL said it was impossible to prove it now, because the person who took them was dead; and, if Mr. Johnson objected to that point, he could not carry the matter further. The only samples then, the taking of which could be proved, were those of the Lyme Park water, upon which Dr. Taylor could be examined.

By Mr. JOHNSON: I have not been down to Lyme Park at all. I am only able to tell from the specimens furnished by Mr. Spencer.

Mr. *Spencer* recalled, examined by Mr. RODWELL.

I brought up my specimens. They were all sealed at the George in my presence. I only went to take my own; but I thought it would facilitate matters if they were sent off to Dr. Taylor in my packet.

James Simpson, Esq., C.E., examined by Mr. RODWELL.

I am a civil engineer, and I have had great experience in the construction of all public works, but in particular of water-works. I was engineer to the Manchester and Salford Water-Works sometime before 1848; and, about that time, or during that time, that company had to consider the necessity of getting additional supplies. They sank a well, and obtained 1 million gallons a day; but, when it came to be continuously used, that fell off. From my experience of well-sinking, generally for the purpose of obtaining a large supply of water, that is an uncertain source. There are other objections besides the want of continuous supplies; occasionally, the water was very hard. In 1854, a plan was proposed for supplying Stockport from Lyme Park. I was employed on that occasion, and I deposited plans for an application to Parliament. That was abandoned at the time, in consequence of the unfavourable state of the pecuniary matters. The parties told me that they did not expect that they could raise the capital, and they did not choose to go on with it. In the autumn of 1860, this proposal for supplying Stockport was revived. I was then consulted, and plans were deposited again. I consider that the river-water of the Goyt or Mersey is not fit now for the supply of Stockport. I have observed that it has been gradually deteriorating for the last few years. It has become more and more contaminated from the population and the works on the river, and I think it has been accelerated by the water being taken away by the Manchester water-works, so that it is not diluted to that extent that it would be otherwise. Both those circumstances combine to deteriorate the stream. I do not consider that that water, even if filtered as the Stockport company do filter it, is fit for the supply of the town. The filtering renders it clearer. If I were very thirsty, I should not mind drinking it. I have tasted it, in fact. It was not remarkably disagreeable. The filtering had very much improved it. I am engineer to the Chelsea Water Works Company.

Mr. RUSSELL: Do you think the area of Lyme Park—1700 acres—would be sufficient to supply the town of Stockport?

Witness: Yes, I think it would be sufficient.

Mr. KER: Do you think, as an engineer, that water brought in pipes a long distance is wholesome to use for family purposes?

Witness: It would not make much difference.

Mr. KER: Do not the pipes become corroded?

Witness: We generally find the water perfectly pure.

Examination continued: The works proposed to be made at Lyme Park will consist of three reservoirs, with main-pipes, as shown on the plan, and a service-reservoir. The gathering-ground is 1667 acres. The pipes run under the turnpike road, and so go on to the town and suburbs of Stockport. My estimate of the cost of the proposed works is about £80,000. The road along which the pipes will be put is a very wide road.

Mr. RUSSELL: What is the rainfall in Lyme Park?

Witness: I have taken some pains to tell what the rainfall is, and I think it will be 32 inches, of which I allow 12 inches for evaporation. Taking only 18 inches, it would yield 1,870,000 gallons per diem. That is taking every day in the year. I do not find that so much water is used on Sundays. The population of Stockport, according to the census of 1851, was nearly 54,000. I have taken for the basis of this calculation that we should have to supply a population of 60,000. That is, taking the outlying population, and the increase now. I generally calculate twenty gallons per head per diem. The amount of water over and above what would now be required for

the town would of course be suffered to go down the stream, and the millers and others would get the benefit of it. Stockport may not be a very increasing place at present, but I believe it will increase in time. I have had observations taken with reference to the rainfalls in various ways, and gauged them. I have no doubt whatever, that the gathering-ground will be amply sufficient to provide water for the supply of the town. I think that is good water for all purposes. I should think it would make good ale. The pressure would be quite sufficient to supply the water to the highest parts of the town. The stream called Bramhall Brook would be reduced in bulk to some extent. That appears to me to be a case for compensation by money. The reduction would in part be compensated for by having sluices, whereby the water might be let off as occasion required. The width of the brook is in one place 15 feet. It varies in depth very much according to the seasons. Upon the whole, I think there is no difficulty in making arrangements with Colonel Davenport, so as to allow of the brook being equally ornamental.

Cross-examined by Sir F. SLADE. I was asked to go down to see Stockport in reference to this scheme last August. Though we might provide compensating-reservoirs which would serve the purpose of Colonel Davenport, in some seasons, I am aware there are other seasons when we should not be able to afford a sufficient supply of water to do so.

TUESDAY, MAY 14.

Mr. *Simpson* recalled, and cross-examined by Mr. JOHNSON.

I have been the engineer for the Lambeth and Chelsea Water-Works. Those districts improved their supply by going to a higher source. The drainage area of Lyme Park is 1667 acres. There is a diversion of one of the streams, which has been made at some period, I do not know when—fifty or sixty years ago, perhaps longer. That applies to about 300 acres of the 1667. I calculate the population to be supplied at present at 60,000. I do not mean to say that the total population of the entire district which we now seek to supply is 60,000; there are many outlying places. If those parties came forward, and were willing to pay the prescribed sum under the Water-Works Clauses Act, we should be compelled to supply them. We are taking powers to supply the whole of Stockport, and the outlying districts. We are not taking these powers without an intention of exercising them; but it is the result of my experience, that we never supply the whole district. I mean to say, many places will not take the water. I do not know the total amount of the population within the area over which we take powers. I looked over the last papers, and got as high as 70,000. By the census of 1851, there were 54,000 in Stockport, and I should say there would be an increase of 2000 since. In constructing water-works, it is the practice to provide for the prospective wants of the district. I should not recommend it to be done without such a precaution, unless there is something which prevents an extensions If we knew it was a very flourishing district, we should take it at 2½ per cent. per annum; and, in other cases, we might take it at 1 or 2 per cent. I heard Sir W. Alexander, in his opening, speak of the enormous population, and say that the result would be to increase the contamination of the water. I understood that was where the large mills were situated. I believe what I have provided for to be a very liberal allowance. There is no regular rule at all for the increase of population. In some cases, I have allowed as much as 5 per cent. per annum. The minimum, in a manufacturing district, would be 2½ per cent. per annum. I think it is a large minimum for Stockport, seeing that they only had in the borough an increase of 2000. Twenty gallons per head is the ordinary quantity. I estimated for the wants of the town, 15 gallons. The quantity of water required for domestic supply is generally less in a manufacturing district. I would not provide any less than that. I think it is more than Stockport will take; but, at all events, I have allowed it. There are two Markwell gauges, called the Markwell Aqueduct and the Markwell Top Knot. I do not attach much importance to either of them. I rely principally upon the Whaley-Bridge gauge. I should rely on a rainfall of 30 inches. A rain-gauge of nine months may be used as a reference, if for no other purpose. It is the common practice to take twenty years as necessary to insure a correct average. Except the gauge which I set up for nine months in Lyme Park, there are no others on which I rely, except the Whaley-Bridge. I only know the heights of the gauges from the published papers. I believe these returns give the inches of rainfall, according to the index of register of the various rain-gauges.

Mr. JOHNSON: What is the rain-gauge at the Markwell Top Knot House?

Mr. KER: It is 24 inches. If he does not understand it, it is very little use going into this evidence. If we do not get a clear idea at the beginning, we are not likely to understand it.

Mr. JOHNSON: I am very sorry if the whole case is not intelligible, because you have to take the mean of the rainfall for a series of years, and from that alone you can get the supply of any district; and you can only get at that mean by the various inches you get over any district of land.

Mr. KER: Mr. Simpson does not mean to rely altogether upon rain-gauges, and he knows more about it than I do.

Cross examination continued: The Markwell Aqeduct measures, upon an average of nine years, 26·23. I believe that gauge is 25 per cent. under its proper average. The Top Knot register is worse still, because it is said that the higher ground registers the lowest average. I do not think either of the gauges are of any good. The average gauge of the Markwell Top Knot House is 24½ inches. The register of Spous Hill for six years is 35·94. And of Whaley-Bridge for ten years 33·9 I think the Whaley-Bridge gives a very good indication of rain as regards its position; but I do not think the bulk of the rain falls there. I have not taken the average rainfall for the district, seeing that I could not rely upon the gauges. The calculation is to allow one-sixth for successive dry years. I was the engineer engaged in the supply of Newcastle-upon Tyne. The drainage ground was situate thirteen or fourteen miles from Newcastle on higher ground, near the hills. The rain at Newcastle was registered to the depth of 30 inches in some years, but I have since had reason to doubt those gauges. I gave evidence at that time that I thought 12 inches would be available to the reservoir. Our original calculation was for between 3 and 4 million gallons per day. The reservoirs failed when we attempted to supply 2 millions. In 1854, the supply was exhausted, and they had to pump from the river Tyne. There were only 6½ inches of water collected. The works were enlarged after that, and they went for additional supplies to another source. The town continued to take more water till it got up to 4½ million gallons. The pipes, instead of being made 8 feet in diameter, were 2 feet. It was estimated at that time to supply 3 million gallons a day, out of which it was discovered that there was a very large leakage into a coal-pit. Mr. Nicholls estimated the waste at 50 million gallons in the year. There was a hole in the reservoir. I have known Lyme Park for fifteen years. It is one of the wet places of that district; I used to think Manchester wet enough, but I have found more wet in Lyme Park. I took the driest years in my calculation. I find by the paper that in the year 1855, the Whaley-Bridge gauge only registered 24·39. In 1857, it registered 27 inches. I do not think I ought to take 27 as my measure, and not 32. I allow the average loss for evaporation and absorption. Part of the drainage ground is poor soil; a large portion of it has been drained. Twelve inches is the allowance; that is the largest deduction; if we had 32 inches rainfall, we should allow 14 inches. Supposing we were to make compensation in water, the usual allowance would be one-third. In this case, I have recommended the parties to retain the water. Sometimes in the case of millowners we claim on their part 2/5ths. I have acted as often for millowners as for anybody else. The probable cost of engines, boilers, &c., sufficiently powerful to pump 1 million gallons a day would be from £25,000 to £30,000 at Stockport; for, unless you get a sufficiently depressed point, you will get very little water. The surface wells are no guide whatever as to the depth we must go. We met with about 100 gallons a minute at 35 feet, but we wanted to get 1000 gallons a minute. We went to 185 feet, in the first instance; it has been sunk about 20 feet since, and it has been bored about 160 feet since that. I think the total quantity of land required in Lyme Park for the reservoirs would be about forty-eight acres including the banks. That is the total amount taken, not simply for the land covered with water, but for all the purposes of forming the requisite works for the Stockport supply. The capacity of the reservoirs is 239 million gallons. The upper one 74 millions; the Hurst Coppice 86 millions; and the Elmhurst 79 millions. That would give 180 days supply for the present population, and 150 days supply for the prospective population. There is a certain quantity of water running down the stream, which taken together with the reservoirs would give 214 days supply. We propose to pay rent for the land occupied by the reservoirs; I do not know the amount. Part of the contingencies and compensations are included in the £16,153. 16s. 0d., because the others are included in the works. We require four acres for the service-reservoir; and two for the house, making six acres in all. I suppose the service-reservoir would contain 6 million gallons of water.

By Serjeant WHEELER: We have included 10 per cent. for contingencies. It is included in the amount we have assigned for landowners—in that item of £16,153. That will not include the sum to be paid to the owner of Lyme Park; we propose to pay rent for the land. The rent has been spoken of as from £8 to £12 per acre. The 48 acres is not the highest part of the country. There are hills higher beyond it, but not in one range. The maps were prepared under my direction, showing the drainage of the county, down to Cheadle. We take 1667 acres of the 12,297 acres forming the water-shed for Mr. Turner. The 10,670 acres left are much lower land than Lyme Park. Being lower, there would not ordinarily be so much water as there would be on the higher land. The difference of elevation between Lyme Park and Mr. Turner's works, I believe, is upwards of 800 feet. I have not examined Mr. Turner's wells. I assume that compensation would be given in money. I do not know the quantity of water Mr. Turner uses. I know that, at works like his—bleaching and printing-works—they require a good deal of water. I have heard that the quality of the water is a matter of great importance. The works of Mr. Sayers, Mr. Markwell, and Mr. Bostock, are supplied from the Knicker Brook. In the bill before Parliament, there is no provision made for compensation-water. The proposed works would take from eighteen months to two years to construct. We might get a reservoir so far advanced as to begin to collect the water in twelve months. The £80,000 comprises the cost of the works to the town of Stockport. I estimate £20,000 as the cost of piping the town. That is in addition to the £80,000. The bill has been altered, in that respect, from £80,000 to £100,000.

Sir W. ALEXANDER: The capital is £100,000, and the estimate is £80,000.

Cross-examination continued: I have no particular estimate of revenue; I have an estimate in my own mind; the promoters have not called upon me for an estimate. I expect to make £10,000 a year gross. I think the working expenses will be £1500 a year, including rent. The revenue of the present company is £5300; but there are a great many places they do not supply. I think the work has been conducted very quietly, and persons, I am sure, would have been very glad to have taken water on. I am not aware that they supply 50,000 people. I know that, in other works, they have very much increased the rental, where they have got better water, and afforded more accommodation to the people. I have no doubt better water will go a great way to double the income. I think the new company, with good water and fair accommodation, will have very good custom.

A MEMBER of the COMMITTEE: What is you opinion about the use that can be made of the old works? Do you think they can be used?

Witness: They may, to some extent.

By Serjeant WHEELER: I was engaged in the scheme of 1854. It was a scheme to get the water from Lyme Park, almost identical to this. That fell through for want of money. We did not take it to Parliament beyond depositing the plans. I do not know whether any company was formed: they paid me my bill. I have no doubt an amalgamation would be a great benefit to the companies, and Stockport and all. The difficulty is to get parties to agree.

A MEMBER of the COMMITTEE: Is there any possibility of an arrangement being made between the promoters of this bill and the old company, so that they could act jointly to supply Stockport without any injury being done to the old company, who cannot expect, so far as this committee is concerned, that they should be allowed to continue the supply alone?

The CHAIRMAN: That arrangement would, of course, include compensation to the millowners.

Sir W. ALEXANDER: When I opened this case, I said we sought for no monopoly; and, I went on to say that I thought the old company would be very useful to a certain extent. I shall not discourage anything of that kind. I can only say, I think the observation of the committee is worthy of consideration.

Mr. WEBSTER: I am quite sure their observation is entitled to receive most serious consideration at our hands. But there is no doubt that, when our turn comes we shall probably be able to present a very different case, not only as regards the state and supply of water in Stockport—at all events, as regards the capacity of the supply. It is often very easy to make a case against a company. I am much obliged to the committee; still it is quite obvious that we were prepared to do something more for Stockport. In fact, I think they will find we were prepared to do the best we could under the circumstances.

The CHAIRMAN: It is quite right that we should hear the case of the old company.

Re-examined by Mr. CRIPPS: That stream that goes to Elmhurst is a part of a stream which formerly did flow over down to the Poynton district; it must be a great many years ago. The drainage at Lyme Park is but very little better than the lower drainage—as 18 to 17. I think it would be the most judicious course to compensate the millowners in money rather than water. I think we might compensate everything; in fact, I should feel great confidence in satisfying Colonel Davenport. I think the abstraction, in point of depth, from his brook, would only be 1½ inch. I have had a great deal to do with ornamental water. The Whaley-Bridge gauge is the nearest correct. That averaged for a series of years 33·91. We have taken 30

inches as our average, and I am quite sure are on the safe side. I have fully considered the question of supplying Stockport from the red sandstone. I do not think the Liverpool circumstances would apply to Stockport. I believe they get water at Liverpool, but I doubt whether they get anything like the quantity they require. They may get 1,000,000 gallons a day; but, if they do, it would be very hard water. It is a fact that the water pumped from the new red sandstone becomes harder invariably every year; while that from the old red sandstone becomes more saline. I have heard that the water at Birkenhead is much harder than it was when examined a few years ago; but I do not know much about it. I know that the Stockport Water-Works used, some time ago, to obtain their water from the red sandstone; but I heard it was abandoned on account of the hardness. I think the Wolverhampton experiment has been a total failure; and I know that they have been obliged to construct other works to get the water. I think the Lyme Park scheme is good for twenty or thirty years at least—probably forty; there are few water-works in this country that will last that time without alteration and addition. I think Lyme Park is a very good scheme; it produces beautiful water, and certainly I should not have much fear in competition with the sandstone harder water. We might increase the number of reservoirs; but, in a dry year, or two dry years, you could not fill them, and, therefore, it would not be any use. Our reservoirs are constructed prospectively. Taking the prospective increase of the population up to 80,000, our reservoirs would contain a supply for 204 days, including the run of the brook. That is as large a provision as I should think necessary for practical purposes. Had I not had a favourable opportunity of making the reservoirs, I should not have put so much; probably 167 days would be quite sufficient. Our proposed service-reservoir is 43 feet above the highest part of Stockport. The reservoirs are nearly 300 feet above. In the case of an emergency, such as a fire, we should be able to increase the pressure by connecting the upper reservoirs. Most probably, I should put a controlling-valve. That would give jets, that would go over the highest building. I speak that from practical experience, because I constructed the original works at Liverpool, and the task they set me was to construct works that would throw water over the warehouses, 90 feet high. In each of the items, I have a margin of 10 per cent. over the estimates. We have had tenders for the works already, according to my own estimates. We have got contractors who will undertake to carry out the works on my estimates. I placed the plans before them, and let them go into the whole question, and they were quite ready to go into it. They have carried out my works before, and I have great confidence in them.

Mr. *James Glaisher*, examined by Mr. CRIPPS.

I am secretary to the British Metereological Society. I am superintendent of the metereological department of the Greenwich Observatory. I have been engaged in taking observations at the Royal Observatory since 1835. The mean of rainfall would be a subject I should peculiarly consider. I have been in the habit for some time past of recording those observations, and of superintending observations which have been made over the country generally. I receive those records monthly on printed forms. These observations have been printed and published for the last fifty years. Great care is taken to ensure the efficiency of the instruments used. I have to give a certificate, and not only that, but to visit almost every station from time to time, to see that the instruments are properly placed, that the observers are taking their observations correctly, and to see that there is one uniform system carried over the country. I have visited Lyme Park. [The witness then produced and read a table of the rain-gauge as taken in that part of the country since 1850]. He said the mean of those gauges was 29·8. But, taking the average height of Lyme Park as being about 800 feet higher, it would give an average rainfall of 42 or 43 inches. The average rainfall in the three driest years was 33 or 34 inches; the driest year, 32 or 33. He thoroughly rejected the Top Knot gauge. He said the evaporation at Lyme Park could not exceed 9 inches; but he would rather take 10 inches, and then in the driest years they would have 20 inches of available water, out of 30 inches. Directly or indirectly, all the water would be attributable to rain-water. The water in reservoirs arises principally from rain. Each acre would produce 22,622½ gallons; giving a total result of 754,236,000 annually. Upon the average, it would produce 2,066,407 gallons per day. The average in London is about 24 or 25 inches. As you go northward, it becomes higher.

Cross-examined by Mr. WEBSTER: The nature of the soil has a good deal to do with evaporation. The position of the strata is also of very great consequence. On a mountain-side, the evaporation would be less, because the water would run off. Evaporation reaches the maximum on a clayey soil. The Markwell Top Knot gauge is very much too little. I think the Markwell Aqueduct gauge is to be depended upon. That last year gave us 39 inches. The Markwell Hill gauge is more than 10 inches out. I have not the slightest doubt about it. I did not go to Sponshill. That gauge is only measured weekly; but there is evidence that it cannot be right. I think the Whaley-Bridge is an excellent gauge. It is admirably placed, and well adapted for its purpose.

Thomas Hawksley, Esq., C.E., examined by Mr. CRIPPS.

I have had very great experience in all matters of engineering connected with water companies for a considerable number of years, and have erected a great number of water-works in different parts of the kingdom. I have considered the present supply of water at Stockport, and the proposed supply to be obtained from Lyme Park. I know Lyme Park very well. I think you might get 20 inches of water in the year from it; but 18 would be a very certain supply. That supply I calculate on an average of three dry years. Large reservoirs will adjust the water for that period; and, therefore, we take it as the basis of our calculations. That water would be sufficient to supply 100,000 people. I have considered the character of the water. Part of it is spring-water, and part surface-water. The surface of the ground is good; it is very clean, and free from cultivation, and free from smoke or nuisance of any kind. There is no drainage anywhere near. In point of fact, I consider it a highly favourable spot to obtain water from. I do not think there is any source in the neighbourhood of Stockport to which the people can reasonably look for their water supply. It is the largest of the available sources in that part of the country. The site appears to me to be well selected. I have known it for fifteen years. I think the capacity is sufficient. Reservoirs capable of holding 150 or 160 days supply, are considered sufficient to adjust and make regular the rainfall of three dry years. I have considered what has been proposed, as to supplying Stockport by pumping the water from the new sandstone. I know the sandstone very well. I do not think it is a favourable mode of supplying a town like Stockport. You cannot get the water of a sufficiently soft quality. It would be very hard. Sometimes, it is from 6° to as much as 30° or 40° of hardness, according to the quality of the sandstone. In some places, the sandstone is more siliceous, and in some places more calcareous. Water has been taken from the sandstone. That water was originally about 6° of hardness; now, it is about 14°.

Cross-examined by Mr. WEBSTER: I have never known any water taken from the sandstone so soft as rain-water. I know the Birkenhead water; it was very fair water, of about 6° of hardness. I assume that the rainfall at Manchester is established to be 30 inches. Lyme Park, which has the same aspect, is about 800 feet high, and I know by experience that, under these circumstances, the collection of rain would be more than on a lower elevation. That would give me for Lyme Park 40 inches, when it is 30 at Manchester, on the average. I know as the result of an extended experience, that the result of three dry years is almost precisely one-sixth less than that of average ones. Taking the one-sixth off from 39 inches, would leave 32½ inches; and then take from that 13 or 14 inches, if you will, for the evaporation, and you have 20 inches remaining. But the evaporation is less in dry years; the power of evaporation of course is greater, but then the water is not present to be evaporated. I form a higher amount of evaporation at Lyme Park than Mr. Glaisher, from data obtained in the observation of large reservoirs, and the quantity of the rain that falls.

Mr. *Whittaker*, examined by Mr. RODWELL.

In May last, I sent two samples of water to Mr. Spencer, 192, Euston Road, London. Those were the samples I took [producing samples]. They were sent on Friday, the 3rd of May. The first came from the gas-works, and the other from Messrs. Hampson and Brooks—those are sandstone-works.

By Mr. WEBSTER: The gas-works are between the churchyard and the river. The churchyard is higher than the well.

Mr. *Thomas Spencer*, examined by Mr. RODWELL.

I received those samples; they are the samples of which I have given evidence. I uncorked them myself, and I analyzed them in the same state in which they came to me.

Mr. *Thomas Statter*, C.E., examined by Mr. RODWELL.

I am agent for the Earl of Derby. In that capacity, I have to superintend, and am concerned with, a great number of mills, bleach-works, dye-works, and property of that description, in the manufacturing districts. I am not Lord Derby's general agent, but I have the control and direction of 20,000 acres of his land in the manufacturing districts. I am often employed in valuing such works, and I am consulted in compensation cases. I know the condition of Colonel Davenport's estate, and the property of which he is the owner. I do not think the proposed works would have any perceptible effect upon the stream that passes through his property. I should think 1½ inch is as much as it will be reduced. I do not think, as a feature of the scenery, which no doubt it is, that it will be affected. I know Mr. Turner's property. He has printing and bleaching-works. I do not think there is anything special in that case. There is a very large gather; the stream is an exceedingly rapid one, and very liable to floods. The banks require a considerable amount of maintenance, and the weir on Mr. Turner's works tells a casual observer that there must be very large volumes of water passing through in times of flood, which are not only not useful, but positively prejudicial to him, and in times of comparative drought he has very large reservoirs for the reception of water; and, to show that the water is in large quantity, he uses a large proportion of it for power. In addition to the water-power he has steam-engines. Unless the stream is comparatively regular, it is of little value as power, although, it is exceedingly valuable for manufacturing purposes. If there were any diminution in consequence of the abstraction of this water the only thing to be done would be to increase the steam-power which they now have. The circumstance of their having applied steam-power shows that steam-power is a much more valuable power to have than a fluctuating water-power. The 6th section of the Water-Works Clauses Act provides full compensation.

Cross-examined by Sir F. SLADE: I think this proposed scheme will have very little influence upon the Earl of Derby's property. I form that opinion from a personal inspection. I went over the property and examined it very carefully. I walked through the park on a day when the water was about as low as it well could be. I did not measure its depth, but I should say it was from 9 to 12 inches. I was told by a person who lived immediately upon the spot, that he thought it had been a long time since the brook was as low as it was that day. I was told the same thing by other persons.

By Serjeant WHEELER: In cases where there have been existing mills upon streams, the usual plan has been to give one-third of water, and to distribute.

Serjeant WHEELER: Do you know any case yourself, in which an Act has been passed appropriating streams that serve the purpose of existing mills, where compensation in water has not been provided for by a clause?

Witness: I do; the Preston Water-Works. There is no compensation-reservoir there; the millowners were compensated in money. I am not aware of any other instance. In acting for Lord Derby, I have had water-compensation clauses provided.

Serjeant WHEELER: What I want to know is this, whether in point of fact the rule has not been where a stream has been appropriated, which at the time of its appropriation supplied existing mills, to give to those mills compensation in water?

Witness: Yes; it has been the principle that has been applied, and I think a very equitable one. One-third of the water has been the general principle, coming for twelve hours, or distributed sometimes by agreement amongst the millowners themselves, and sometimes by specific regulations in the Act of Parliament. I was at Mr. Turner's works long enough to know all about them as connected with this water. I did not see any necessity for going inside. I know what bleach-works are.

Re-examined by Mr. RODWELL: Mr. Turner's furnished me with the dimensions of the wheels. They are 13 feet in diameter. One is 5 feet broad, and the other, 5 feet 3 inches.

WEDNESDAY, MAY 15.

Mr. RODWELL: The only evidence we shall call further is evidence with regard to the estimates. We shall call the two contractors who have offered to carry out the works upon Mr. Simpson's plans.

Mr. *John Aird*, examined by Mr. RODWELL.

I trade under the name of John Aird and Son, contractors. In the month of April last, I had some plans and specifications sent me from Mr. Simpson, the engineer to the Stockport Water Company. I prepared my estimates according to those plans. I put in a tender for £45,958. 14s. I have made a tender for pipe-laying, and other works, which would be incidental to the laying the mains. The tender is £4812. 8s. That tender I am willing to abide by.

Cross-examined by Mr. WHEELER: There would be 700 yards of 12-inch pipe; 5500, 15-inch; and 6400, 24-inch. The tender is simply for the construction of the works, and does not involve any question of maintenance or compensation.

A MEMBER of the COMMITTEE: I believe the maintenance is usually entertained afterwards by the company?

Mr. WEBSTER: It is not unusual for contractors to enter into a contract to maintain the works for a certain time.

Witness: For twelve months. If any accident should happen during the construction of the works, that would fall upon me. I am quite satisfied with the proposed mode of payment.

Mr. *Cochrane*, examined by Mr. RODWELL.

I trade under the name of Cochrane and Company. I have iron-works at Dudley. I have been furnished with the plans and specifications for the works connected with the Stockport Water-Works by Mr. Simpson. The contract is to supply 6400 yards of 24-inch pipe, 5500 of 15, and 700 of 12, for £17,887. 10s. I also put in a tender for 55,000 yards of surface distributing-pipes, averaging 5 inches in diameter, of £14,566. 13s. 4d.

Cross-examined by Mr. WEBSTER: That is for the pipes only; it would be in addition to Mr. Aird's contract.

Mr. RODWELL: That closes the promoters case.

J. F. Bateman, Esq., C.E., F.R.S., examined by Mr. WEBSTER.

I am engineer to the Manchester, the Glasgow, and many other water-works. I have had great experience in the formation of water-works in England, Ireland, and Scotland. I have known the Stockport Water-Works since 1835. During that period, I have made myself acquainted with the quality and quantity of the water in that district. I examined the position of the water-works in 1849, with a view to the formation of a company. I found that the water was supplied partly from the sandstone by a pump, and partly from the river. At that time, there was a considerable expenditure. In 1850, one-third of the amount of the whole of the property was purchased by strangers, at least by other parties, two-third of the property remaining in the hands of Messrs. Marsland, and a joint stock company was formed. They then commenced very material alterations which were carried out. The water in the river at that time was very good. In 1847, the water was analyzed by the late Mr. Phillips, and it only contained ·28 grains of organic matter, and was of 3·70 degrees of hardness; being very superior water indeed. I recommended that the company should take their supply from the river on account of its softness. At that time, the water was very excellent, and the best proof of its appreciation is this, that the number of tenants when we took possession of the works was about 4000. The extensions were carried on in 1850 and 1851; and, by the end of 1852, the tenants amounted to 7000, 3000 being added during that time; and the water was then supplied to about 40,000 people out of a population of 56,000. Since that time, I may say that the increase has been gradual and regular, the number of tenants is now about 9600, and the population we supply about 50,000. The water flows from the river to Nab's Pool, through the tunnel into the reservoirs. That spot is 36 feet higher than the highest street in Stockport, and about 140 feet above the bridge called the Wellington Bridge, referred to by the promoters of this bill. The difference between the height of the service-reservoir of the old company, and the proposed service-reservoir of the new company is 6 feet. The proposed reservoir is 6 feet higher, but then it is a mile further from the town, and more than 6 feet would be required to account for that distance. Since 1849, the supply to Stockport has gone on steadily increasing. The expenditure more immediately under my own control was about £12,000, chiefly expended in increased piping; but they have been expending money since that time, to what amount I cannot tell you. The works from first to last, when they were in Mr. Marsland's hands, must have cost a great deal of money—I should think £60,000 or £70,000. In 1847, a part of the water was supplied from the new red sandstone—about 258,000 gallons a day. That well is still in existence, with the pump attached. It is now occasionally resorted to, and might be brought into use any day. I cannot give you the depth of the well; I do not know that it is more than one hundred yards; at all events, there is a very large supply of water there. The water is taken from the river at all times, except in the time of floods, when it is not fit to take. Sand-filtration was the only process it underwent until recently, when, in consequence of a peculiar pollution, charcoal has been employed. All the water is most carefully filtered. At the end of 1852, the tenants numbered 7000; that would represent (I see by the population papers that the number of tenants to a house is 5·65) about 40,000 persons. The number of people supplied at the time we took the works was about 22,000; at the end of 1852, it was 40,000. Since that time, the increase has been gradually going on, and now amounts to 9600 tenants, a rental of about £5300. There is a peculiarity about the rental. We have 9600 altogether; 7000 are charged 8s. a year, and less; we have 2300 tenants at 8s.; 4300 at 6s.; and 400 at 5s. I believe our average rental is about 8s. 2¼d. per tenant. On an £8 house, we are authorized to charge 12s.; we charge 8s.; and, if the landlord will undertake to pay the rent, we charge 6s.—one-half what we could charge by Act of Parliament. In 1854, there were suggestions made for getting the water from the Lyme Park; that was only three years after we had expended this large sum of money. The town of Stockport was perectly satisfied with the supply of water; and the newspapers commended the company for what they did. In the autumn of the year, some gentlemen laid before me a project for getting the water from Lyme Park. On that occasion, the water of the river, and the water of Lyme Park were analyzed. I represented to them that the Stockport Water-Works had just been laying out a great deal of money, that the town was perfectly satisfied, and that there was no necessity for another supply. I thought I had satisfied them, but there were plans deposited; they got no support from the town of Stockport; and, at that time, I had samples of water analyzed.

Mr. RODWELL: Then you cannot give evidence on its analysis?

Sir F. SLADE objected to Mr. Webster going into the details of the analysis without having the party here.

Examination continued: It was sent up and analyzed by my direction, and Mr. Campbell made a report to me. The gentleman who sent it, and the gentleman who analyzed it, are here. A sample was sent of the Lyme Park water, and of the water we were supplying. I have Mr. Campbell's report. The river-water, when Mr. Campbell analyzed it in 1855, had deteriorated in quality. As then delivered to the town of Stockport, its contents were 7·72 grains of solid contents per gallon; 2 grains of organic matter; and the hardness was 3·85. The Lyme Park water was analyzed at the same time; and, I may observe, that this analysis—as I know myself, having been there—was made within about a fortnight of very heavy rain. Elmerhurst Brook contained 9·80 grains of solid matter; 3·16 organic matter; the hardness, 4·5. Bollinhurst contained 8·32 solid matter; 1·88 organic matter; and hardness, 4·10. So that, at that time, the Lyme Park water was very much inferior, in all respects, to the water supplied by the water-works company; it contained a greater amount of solid matter, a much larger amount of organic matter, and the hardness was greater. That was Mr. Campbell's analysis. Nothing more was heard at that time of the proposal to form a company. Between the years 1854 and 1858, some of the largest print-works upon the upper part of the river were very much enlarged; and, in going over the water-works, which is my duty from time to time, I observed that they sent a great deal of polluting matter into the stream. I drew the attention of the Stockport Water-Works Company to the fact, stating that it was necessary for them to prevent the pollution of the river. Upon that, the directors instructed various chemists to analyze the water. Mr. Crace Calvert was one of the chemists, and Dr. Lyon Playfair and Dr. Miller were others. In consequence of the reports received from those gentlemen, notices were served upon the printers who were polluting the stream, and actions subsequently brought. Verdicts have been obtained; two of these parties have submitted to injunctions, and the third is still going on with his works. I am sure it is possible for them to carry on the works, and reduce the pollution to a very considerable extent. During this time, no complaints have been received as to the quality of the water, except from individuals living near the end of the pipes. Everybody living near the end of the pipe must expect that the water will sometimes not be so sweet as it ought to be. Wherever there is a dead end, and there is not a free circulation of water, it will deposit. The water becomes comparatively stagnant, for want of sufficient circulation. I have not given you the analysis, but it will be given. The hardness had increased to 6°. The reason why I do not give it is because I cannot say so much about it as I could about Mr. Campbell's. The increased hardness was, no doubt, depending on the ingredients poured into it improperly. The action that took place against the owners of the print-works was in consequence of my drawing the attention of the directors to the condition of the river.

Mr. WEBSTER: Do you know anything about the feasibility of getting a supply from the Manchester corporation?

Mr. RODWELL: I must object to that, on two grounds—first, that in the petition they have drawn no attention to it; and, secondly, that they have not cross-examined on it. The 104th section of the Standing Orders says that "the petitioners shall be only heard upon such grounds as stated, and if it shall appear to the said committee that such grounds are not specified with sufficient accuracy, the committee may direct that they give in to the committee a more specific statement in writing." That meets this case, for our attention was not called to this Manchester scheme by the allegation in the petition. Our witnesses have been called, and have not been cross-examined on the subject, and therefore I submit that they are not in a position to raise any question as to their being supplied from Manchester. And, if you should deviate from the rule, I would intreat the committee to allow us to recall witnesses who would satisfy you that there is no possibility of supplying the town with water from Manchester.

Mr. WEBSTER: My learned friend is quite under a misapprehension as to the facts, because it will be in your recollection that I myself asked more than one witness whether they were not aware that arrangements had been made with the Manchester Water-Works, and whether they would not be perfectly satisfied with that? And more than one witness said they would be perfectly satisfied with that. His witnesses have been cross-examined upon it, and it is too late for him to make the objection. The Mayor of Stockport himself said, "If we had the water from Manchester, we should be perfectly satisfied." And I asked another witness through the committee, "Have you heard in the last month of an arrangement to have water from the mains of the Manchester Water-Works?" His answer was, "Yes, within the last month." More than one witness—and one is sufficient—was asked distinctly with reference to it. These are facts which I am quite sure will be in your recollection. My learned friend is entirely wrong in his facts, and he is equally wrong in his law as to his construction of the standing order.

Mr. RODWELL: My friend has contradicted me rather flatly, but he has omitted to read these words, "The petitioner shall be heard only on the grounds as stated." That is the simple question; would any lawyer, or any promoter of a bill, ever dream by the words of this petition that the opponents of a bill seriously intended to rely upon arrangements with Manchester? That is the question I put to you. My friend said I was not right in my fact; I am right in my facts. I was perfectly aware that certain questions had been put casually, at the fag-end of an examination. I am perfectly willing to meet them, only I wish in the first instance to ascertain the opinion of the committee, whether the words in their petition would call our attention, by fair implication and construction to anything in the Manchester supply, and whether it was not somewhat unfair, at least disingenuous, not to cross-examine our best witnesses as to it?

After a few minutes consultation,

The CHAIRMAN said the committee were of opinion that, under the circumstances, the Manchester case could not be gone into.

Sir F. SLADE said in all his experience he never heard it suggested that they were to give the exact evidence, the names of the parties who were to give that evidence, and the precise locality as to which that evidence was to be produced. He said that, if the committee decided that Colonel Davenport was not to be heard with reference to the Manchester Water-Works, he should retire from the room, and take no further part in the opposition.

Mr. JOHNSON said he was placed in a somewhat difficult position by the decision of the committee. He felt he must take some action upon it, and, if he followed his present impression, without further time for reflection, he had no hesitation in saying that that course would be at once to withdraw. He should be very sorry indeed to act precipitately, or with any sort of disrespect to the committee; and, therefore, he suggested that they should adjourn the inquiry till the next morning, that the opponents of the bill might determine what course they would pursue. With all proper deference to the committee, he would ask them, if they consented to an adjournment, to consult the authorities of the House with reference to the decision to which they had come.

Mr. RODWELL said he trusted the committee would do no such thing, but that they would go on hearing the case.

The room was then cleared, and, on the readmission of the parties interested,

The CHAIRMAN said the committee were of opinion that, with reference to Colonel Davenport's petition, the case of the Manchester supply could not be gone into. We cannot acquiesce in Mr. Johnson's application for an adjournment.

Mr. JOHNSON: Then, with all proper respect to the committee, I must withdraw from any further opposition.

Sir F. SLADE and Serjeant WHEELER took the same course.

The CHAIRMAN declared the preamble proved, on certain conditions. He was anxious that Colonel Davenport and the millowners should be protected.

The committee then adjourned, that the clauses might be arranged so as to meet their wishes.

THURSDAY, MAY 16.

Mr. RODWELL said, in pursuance of the wishes of the committee, he had prepared clauses, and sent them, with a letter to the agents of Col. Davenport and the millowners. The clauses were returned, with a letter, stating that they did not carry out the direction of the committee, or satisfy Col. Davenport. They also stated that, as they explained to the committee on the previous day, they should not interfere with the clauses of the bill. He said that, Col. Davenport having refused those clauses, it would be for the committee to say whether they would insert them or not.

Mr. WYATT (parliamentary agent for Col. Davenport) said, he wished to explain to the committee the reason why he would not interfere in the clauses. It had been decided, over and over again, that, where parties affected amend the bill, they are precluded from opposing the preamble of the bill in the House of Lords; and hence their reason for silence on the matter.

The committee had been kind enough to say (notwithstanding the parties felt it due to themselves to retire from the room), that they wished their interests to be protected as much as possible, and had shadowed out one or two points on which they considered protection should be afforded.

Mr. RODWELL said, if his friend would only state to him what he required, he would try to meet him.

Mr. WYATT said the onus was on the other side, to carry out the instructions of the committee; and, however desirous he might be to assist the committee, yet he was placed in a technical position that precluded his taking the initiative. Although he was most desirous to save his client the expense of appearing elsewhere, yet he was precluded from taking any part in suggesting alterations.

Mr. RODWELL said he would simply say, in justice to the promoters of the bill, that the matter was taken into consideration on the previous afternoon. Clauses were prepared as speedily as possible, and sent with a request that they would intimate either their assent or dissent, or any modification they desired to be made. What more could they do, if Col. Davenport would not make known his wishes to them? The promoters were certainly taken by surprise at the steps taken by their opponents, and should be very glad of their assistance, to tell them what they desired. He (Mr. Rodwell) would pledge himself to this, that if Mr. Wyatt would state to the committee what he desired, and suppose that the learned counsel were not in the room, he would take no advantage, and raise no opposition to his *locus standi* in the House of Lords.

Mr. WYATT said he was placed in an unfortunate position. His instructions were to reject the bill *in toto*, and endeavour to get rid of it. Matters assumed a shape on the previous day that, under the advice of counsel, necessitated Colonel Davenport's retiring, with the other opponents. He said that, in the absence of all his witnesses and engineers, he could not offer any suggestions, but would invite the other side to state any modifications or alterations they thought fit. If, however, the promoters would ask the committee to defer the report on the bill, till he had an opportunity of consulting his clients, he would endeavour to obtain instructions.

Mr. RODWELL: Every reasonable concession for carrying out the wishes of the committee had been made; but there were limits, beyond which, in justice to his clients, he did not feel justified in going. He had made a great concession in allowing an opponent to discuss the clauses in the slightest degree, and abstaining from bringing that against him in the House of Lords. Having been left without assistance from their opponents, Mr. Simpson had assured him that the proposed clause would meet Colonel Davenport's case, If, however, Mr. Wyatt would pledge himself that Colonel Davenport was acting independently in his own case, and not on the part of the millowners, he would not oppose the postponement. He believed that Colonel Davenport was acting for the old company and the millowners.

Mr. WYATT said he would either go into the box, or, if Mr. Rodwell was satisfied with his *ipse dixit*, he would say that Colonel Davenport was appearing separately, was in no way connected with them, and that he was appearing at his own cost. It was, he said, a *bonâ fide*, honest opposition.

Mr. RODWELL said as Colonel Davenport and Mr. Bateman were in town, he did not think he ought to oppose the adjournment till the next morning, if the committee would consent.

Mr. WYATT said he wished to act most fairly towards the committee; what he was doing was only to carry out their suggestions; and he, therefore, should be extremely sorry to press for an adjournment if it would entail the slightest inconvenience upon them.

Mr. NEWALL (agent for the millowners) said that the clauses had been sent to him; but he had returned them, stating that they would not be accepted, and that the millowners would offer no suggestions, following the course taken by Mr. Wyatt.

The CHAIRMAN then declared the preamble, and the clauses were read and passed.

The Committee then adjourned for two hours, to give Mr. Wyatt an opportunity to consult his clients.

On their reassembling,

Mr. WYATT said he was afraid there had been a misunderstanding. He understood the committee to say "If you can agree amongst yourselves, we will adjourn for two hours, and then we will put in any clause necessary for the protection of the parties." He had striven to put down in writing what he required, but if he was told that they would not agree, it was, he said, of no use having their terms put on the shorthand writer's notes.

The CHAIRMAN: When the counsel on the opposite side said that you might make any suggestions without prejudice, you stated that you would prefer a little time to consult with your principals, to ascertain the objections they had to the clause, and we understood that you would then come before us, and state your objections to the clause, or state some improvements that you desired.

Mr. WYATT said he was very sorry that that was the intention of the committee, because if he had so understood it, he should have most respectfully declined to take that responsibility on himself.

After a little discussion, Mr. Wyatt handed the paper stating the wishes of Colonel Davenport to the committee, and to the counsel for the promoters, they pledging themselves that it should not prejudice his case in the House of Lords.

After reading it,

Sir W. ALEXANDER said they could not agree to those terms.

The bill was then passed.

Legal Intelligence.

VICE-CHANCELLOR'S COURT.

TUESDAY, MAY 7.

(*Before Vice-Chancellor Sir* W. P. WOOD.)

CLARK *v.* THE CORPORATION OF HASTINGS.

It appeared from the bill that the plaintiff, who is an engineer having considerable experience in water-works, under an agreement bearing date February 12, 1849, entered into between himself and Mr. Eversfield, the owner of an estate within the boundaries of the borough of Hastings (as defined by the Municipal Corporation Act), and lying between the town and port of Hastings, as defined by an Act passed in the 2nd of William IV., and the town of St. Leonard's, as defined by another Act passed in the same session, had constructed water-works, and laid down pipes, for the conveyance of water for the use of the houses upon the estate of Mr. Eversfield, and also other estates, all being within the district extending from the boundary of the ancient borough of Hastings on the east to the boundary of St. Leonard's on the west, and from the sea on the south to North Street on the north, the pipes being laid down with the consent of the surveyors of the several highways. The provisions of the Public Health Act were applied to Hastings on August 7, 1851. Negotiations took place, but without result, between the defendants, acting as the local board of health for Hastings, and the plaintiff, for the purchase or lease of the works, &c., which were demised to the plaintiff by Mr. Eversfield for a term of ninety-nine years, commencing from the December 25, 1853, at an annual rent of £119. 2s., until September 2, 1864; and, during the remainder of the term, at an annual rent of £125. The quantity of land forming the site of the water-works and buildings connected therewith was twenty-five acres. The defendants, in the month of February, commenced laying down some pipes within the limits supplied by the plaintiff; but, as water was supplied in only a very few instances, the plaintiff, though he stated his objections to that course to the defendants agents, took no further proceedings with a view of asserting his exclusive right to supply water. In February, 1861, the defendants commenced laying down pipes in some of the principal streets of Hastings and St. Leonard's, for the supply of the inhabitants, all those streets being within the limits in respect of which the plaintiff's water-works were established on August 7, 1851, so that the right claimed by the plaintiff to act as a "water-works company," within the meaning of the Public Health Act, 1848, for the supply of the district, was materially affected. On February 7, 1861, the defendants issued a notice signed by the town-clerk, informing the inhabitants of Hastings that the local board of health were laying down pipes for the supply of water through the western portion of their district; and they stated in that notice that they were doing so "in consequence of a numerously-signed memorial from the inhabitants, complaining of the insufficient and bad supply of water in that district." The plaintiff, having applied to the defendants to desist from laying down the pipes within his limits without effect, filed the present bill, by which he sought to obtain an injunction to restrain the defendants from constructing or laying down any water-works, under the powers of the Public Health Act, 1848, within any limits within which the plaintiff's water-works were established for supplying water to St. Leonard's and Hastings, so long as the plaintiff should be able and willing to lay on water proper and sufficient for all reasonable purposes for which it was required by the defendants, and upon such terms as should be certified to be reasonable by the local board of health after the report of a superintending inspector; or, if the plaintiff should be dissatisfied with such certificate, upon such terms as should be settled by arbitration in the manner provided by the Public Health Act, 1848. The case originally came before the court upon an interlocutory application for an injunction, but it was then agreed that it should stand over for the purpose of being turned into a motion for decree.

Sir H. CAIRNS, Q. C. (with whom was Mr. SOUTHGATE), on behalf of the plaintiff, stated that there were no facts in dispute, but that the question in the case turned entirely upon the construction of the clauses of the Public Health Act, 11th and 12th Victoria, cap. 63, and contended that, according to the right construction of that Act, the plaintiff was entitled to supply the houses in the district that was supplied by his mains which were in existence on August 7, 1851, and that the defendants had no right whatever to lay down mains within that district. Sir H. Cairns also contended that there could be no qustion as to the quality of the water, because the defendants had not given the plaintiff any notice that the water was bad or insufficient, which under the 75th section of the Act they were bound to do.

Mr. W. M. JAMES, Q. C., and Mr. E. L. PEMBERTON, who appeared on behalf of the defendants, contended that the plaintiff had failed to make out that, according to the provisions of the Public Health Act, he was either a water-works company established within the meaning of the Act, or that there was any district or limits which he was entitled to supply, and that, therefore, having improperly filed this bill, it must be dismissed with costs.

The case was argued on Friday last, and stood in this day's paper for judgment.

The VICE-CHANCELLOR: I have felt myself very much embarrassed in this case, by the case of *The Mayor of Cardiff v. The Cardiff Water-Works Company*, and I think that I can only pursue the course that was there pursued. No man can more dislike, than I do, sending a suitor from one court to another, and no one can regret more than I do that the court should not have complete jurisdiction, if any jurisdiction at all. But, in that case, the Lords Justices were of opinion that, where a plaintiff relied entirely upon a legal right, and where the defendant relied entirely upon a legal right, and whereas in that case there was not a single fact in dispute, but it was a pure question of law, and law only, the court were of opinion that I had erred in making a formal order, or decree, without sending it to law. Therefore, it seems to me, the only course that I can possibly follow, is the course pursued in that case. There is this difference in this case, on the ground simply of the balance of convenience and inconvenience, that is to say, if Mr. Clark is right, he would be irremediably injured if he were restrained from carrying his mains. I think upon that ground, and only upon that ground, not prejudging the case at all, not expressing any opinion upon the case, but simply on the ground of the balance of injury, there ought to be an order restraining the defendants from supplying (in the proper form) any houses with water that Mr. Clark now supplies; merely to keep things exactly in *statu quo*, and then direct Mr. Clark to bring an action by the next summer assizes, and, in that action, I think there ought to be an admission by the defendants that they have supplied the houses with water, that the question may be fairly raised between them. I do not know anything else that I can do after the case of the Cardiff Water-Works Company. The cases seem exactly parallel. Lord Justice Turner said: I could not have heard the argument without coming to some opinion; but, when one comes to such a conclusion, it is best that no opinion should be expressed. I was there, very anxious to save trouble, but I only ended in giving it.

Mr. JAMES: Then, your honour says any house that he is now supplying?

The VICE-CHANCELLOR: Yes; any house that he is now actually supplying. That will not interfere with their preparing for any other work. The balance of inconvenience would clearly be against Mr. Clark, because the company may go on executing all their works as long as they do not supply houses. It prevents his customers being taken away from him.

Mr. JAMES: The difficulty is that there are other persons convenience and inconvenience to be considered, that is to say, the convenience of the householders, because it is a very serious matter as far as they are concerned. There was a great quantity of evidence on both sides as to that.

The VICE-CHANCELLOR: He has been ten years doing it; and it is only a question now, between this and July.

Mr. JAMES: We began to supply in consequence of a memorial addressed to us, being a public body, signed by several hundred householders. This is on the question of the balance of convenience and inconvenience. We began our supply, and we went into the district entirely in consequence of a memorial signed by some hundred householders complaining of the water supply. We were obliged to satisfy the public authorities, before we obtained permission to raise money from the Lords of the Treasury, or from the Central Board, to extend our works into that district. Being a public body, we were obliged to satisfy them that public convenience required it. Mr. Clark was not bound by it, but there was a discussion.

Mr. Clark opposed us, and, therefore, with regard to convenience and inconvenience, all the inconvenience to Mr. Clark would be a pecuniary inconvenience, that is, we should be depriving him of the profit arising from the supplying the houses in the meantime, between this and the trial of the action, which your honour has proposed at the summer assizes. That is a mere matter of money.

The VICE-CHANCELLOR: He will be deprived of custom, too.

Mr. JAMES: It is not like a shopkeeper, who acquires a customer; because, if he is right, he is replaced at once in his original position. It is not that we can deprive him of anything permanently. If we opened a shop, which attracted custom to us, it would be a different matter. But the moment he has established his right, he can say discontinue that supply. The only thing he is deprived of would be the money, during that time, which must come to him. It is like tolls. If the toll is restored, he at once obtains possession of his toll again. At present, certain houses pay him so much money; if we supply those houses, which he is entitled to supply, with water, in the meantime, all he can say is, you must repay me that money. But the houses may, in the meantime, be very seriously inconvenienced, pending this trial, as to the sufficiency or insufficiency of the water. We can keep an account. There is a right to be tried, and, therefore, I think your honour will see the balance of inconvenience is with us. We have no personal gain to make. We are only a public body, dealing with a public right. We have no personal gain in any way, and I should submit that the proper order would be to keep an account. We are supplying a great number of houses which he complains of.

The VICE-CHANCELLOR: Not houses that he is actually supplying?

Mr. JAMES: Just so.

The VICE-CHANCELLOR: Houses that his mains could supply. My injunction will only be to keep things exactly as they are. Nothing more nor less. Houses that he is actually supplying, and not any others.

Mr. JAMES: They are not here to be heard. Your honour may be imposing a very serious inconvenience upon them, which they cannot help, and for which they cannot be compensated. Your honour can, in no degree whatever, compensate them for the inconvenience, if we are right. If we are wrong, we can repay Mr. Clark exactly the money which he would have received from them.

Sir H. CAIRNS: Would your honour allow me to ask this question:—I presume you have considered the question of the practicability, if necessary, of hearing a case of this description with the assistance of a common-law judge?

The VICE-CHANCELLOR: I have; but I was held to be wrong in that—in the Cardiff Water-Works case. In that case of the Cardiff Water-Works Company, in p. 4 *De Gex and Jones*, it appeared to me that there was not a single fact in dispute; it was only law. And I thought it was brought to a simple question of whether I should determine it with the assistance of a common-law judge, or not; but there, the court above said I had no jurisdiction to grant an injunction where the matter was not so perfectly clear as to be without the possibility of doubt, and they held that, unless the parties agreed to come and argue it again, it must be established by a trial at law, because the plaintiff and defendant had both legal rights. That was the case there. The defendants stood upon their legal rights, and they said there was nothing to do but to let the bill stand over, and let the plaintiff bring such action as he might be advised.

Sir H. CAIRNS: Notwithstanding the statute, which says that the court may determine legal rights.

The VICE-CHANCELLOR: That was the conclusion come to. I thought I was doing right, but I found I was doing wrong.

Sir H. CAIRNS: I am afraid that was overruling the statute.

The VICE-CHANCELLOR: I thought I could not send it for the opinion of a court of law, as there was no fact to try; and it appeared to me, therefore, that there was no alternative but to decide it. It was held there, very distinctly, by both the Lords Justices, that it could not be done unless the parties consented—unless the right was manifestly and palpably clear. It is upon that ground only I say here, as Lord Justice Turner says in that case, that I cannot have read these papers without having formed an opinion; but, unless I came to the conclusion that that opinion is so decidedly clear that there is no legal doubt about it, I must follow the course there adopted. I extremely regret it; it is very unfortunate.

Sir H. CAIRNS: I should have hoped that the corporation themselves would have seen the advantage of having the matter decided now, without further litigation.

The VICE-CHANCELLOR: I think, Mr. Giffard, you were in the Cardiff case, and you will remember that there was no fact in dispute in that case?

Mr. GIFFARD: There was not.

Mr. WILLCOCK: In that case, there was no question of fact. The facts were agreed to.

Mr. GIFFARD: It was merely a question of construction.

The VICE-CHANCELLOR: Coming across that case, I was arrested at once. What occurred to me here, was, that it was right to keep things in *statu quo*, for this reason—I think the case might be prejudiced before a jury, because there will be a quantity of evidence brought before them by people who will say, "We have got better water now than we had before," and all kinds of matters which have nothing to do with the case. I think it is much better that everything should stand as it is.

Sir H. CAIRNS: I should be quite willing to make my friends an offer that, in order to get the matter disposed of without further expense, I should be satisfied with an early hearing in this court, with the assistance of a common-law judge—not asking for any more protection, in the meantime, than we have got at present. But, if it is to go through the vicissitudes of an action at law, I ask your honour for an order that will keep matters in *statu quo*. Surely, it must be for the interest of both parties, where they agree that there is no fact in dispute, that we should have, if necessary, the assistance of a common-law judge, and have it argued now, without more expense. It is merely a reargument, with all the papers we have.

The VICE-CHANCELLOR: What was the ultimate result in that Cardiff case, Mr. Giffard? Was it not left to the parties to say whether they would argue it before the full court?

Mr. GIFFARD: The result of that case was, that it was compromised; it never went to an action. Substantially, the defendants gave way.

The VICE-CHANCELLOR: I think the proper order to make by injunction is, to restrain them from supplying with water any house that you are now supplying. There can be nothing more done than that, at present. Any house that you are actually supplying; and then for you to bring an action by the next summer assizes.

Sir H. CAIRNS: Any house that we were actually supplying at the time of the notice of motion, because there has been a consent, on both sides, that the matter was to be disposed of as if it had been disposed of at the time we gave our notice of motion.

The VICE-CHANCELLOR: At the time of the notice of motion.

Sir H. CAIRNS: I have got my learned friend's consent.

Mr. JAMES: At the present moment, the court does not decide the matter?

Sir H. CAIRNS: It will be heard, as if it had been heard when first it was ready before the court.

Mr. JAMES: I do not deny that at all.

Sir H. CAIRNS: The defendant undertaking that the motion when heard shall be disposed of in all respects as if heard to day—(that is the 28th of February), and it is to stand over.

The VICE-CHANCELLOR: Has anything been done, in the meantime?

Sir H. CAIRNS: I am told that they have been supplying houses, which were supplied by us.

Mr. JAMES: That is not a logical result of your honour's view in making the order.

Sir H. CAIRNS: I am quite prepared to argue that point.

Mr. JAMES: Things are to be preserved in *statu quo*.

Sir H. CAIRNS: We have got the consent of my learned friends, that the order, although technically dated to-day, is to have all the effect which it would have had if dated on the 28th of February. Therefore, I should ask your honour, although dating the order to-day, to make it in that respect, as you would have made it on the 28th of February. I understand your honour's view would be to keep things in *statu quo* from that time. If they have altered the *statu quo ante*, they have done it under the undertaking that they are to bring it back.

The VICE-CHANCELLOR: It is of great inconvenience to absent parties to bring it back, if it has been allowed to go on to have a changing and shifting of these waters.

Sir H. CAIRNS: They surely ought to have considered that before. They have purchased the delay, upon an undertaking by them, that the motion should be disposed of in all respects, and now they argue that there is one respect in which it is not disposed of.

Mr. JAMES: The motion is not disposed of.

Sir H. CAIRNS: It is disposed of to a certain extent.

Mr. JAMES: As your honour does not declare the right, therefore, it is simply a question of convenience and inconvenience.

Sir H. CAIRNS: Your honour will judge between us, whether an undertaking of that kind, by those who give it, is to be annihilated in that way, because if so, there is an end of undertakings, if they are allowed to put that construction upon it.

Mr. JAMES: It must be observed on both sides.

The VICE-CHANCELLOR: I think that, really, all I ought to do now is to keep things exactly as they are at this moment. I ought not to be called uopn to do more than that. I do it for the purpose of avoiding giving any opinion, one way or other, upon the case, and therefore I would rather prefer doing nothing more than saying that, upon the balance of convenience and inconvenience, it is clearly desirable that things should remain exactly as they are. Therefore, I will make an order restraining them from supplying any house that the plaintiff is now supplying with water, the plaintiff to bring an action, or proceed to trial at the next summer assizes for Sussex—such action as he may be advised—and the defendants in the action to admit (perhaps it will be unnecessary if they have been doing it) that they have supplied houses which the plaintiff was supplying with water in 1851.

Sir H. CAIRNS: Will your honour allow me, with regard to that, a few days to consider whether there should be any admission that we may propose to the court to order?

The VICE-CHANCELLOR: It must be a clear one.

Sir H. CAIRNS: This being a transitory action, a thing wholly unconnected, it is not like an action for real property, where the court is in the habit of saying it shall be brought in a particular place. It may be convenient to all parties that it should be brought in London.

The VICE-CHANCELLOR: I say, such action as you may be advised, but it must be tried at a time not later than at the next summer assizes. You may try it in London for all I know.

Mr. JAMES: Try at the next summer assizes for Sussex, unless the plaintiff can try it sooner elsewhere.

The VICE-CHANCELLOR: What I mean is this, that they are not to try it later than the next summer assizes.

Sir H. CAIRNS: Bring an action, so that it may be tried not later than the next summer assizes.

The VICE-CHANCELLOR: And the cause to stand over till after the trial of the action. If I grant an injunction, you must be put under terms for trial.

Sir H. CAIRNS: Your honour will allow us to mention it on Wednesday, if there is any other point?

Mr. JAMES: That is to say, if I am right in the legal construction, we have supplied houses which were supplied by him.

The VICE-CHANCELLOR: At that date, so that probably the admission may not be wanted. That will be better.

TUESDAY, JUNE 11.

The case was mentioned this morning, and it was arranged that the time for bringing the action should be extended to the spring assizes; the injunction to be dissolved, upon payment of the purchase-money; and, if necessary, to settle the conveyance in chambers.

COURT OF QUEEN'S BENCH.

WEDNESDAY, MAY 1.

(*Sittings in Banco, before Lord Chief Justice* COCKBURN, *and Justices* CROMPTON, HILL, *and* BLACKBURN.)

PRIOR *v.* LAMING.

Mr. BOVILL, Q.C., and Mr. MAUDE, appeared for the plaintiffs; and Mr. HAWKINS, Q.C., and Mr. GARTH, for the defendant.

Mr. BOVILL said that this was a special case, in which the plaintiffs were Edward Staff Prior and Alfred Staff Prior, and the defendant was Richard Laming. The cause came on to be heard at the sittings held in London after Trinity Term, 1860, when the defendant withdrew his pleas, and a judgment was signed for the damages in the declaration, subject to the following case:—"The action was commenced on the 2nd of February, 1860, and the declaration was as follows:—On the 11th day of February, 1860.—Edward Staff Prior and Alfred Staff Prior, by Henry Shepherd Law, their attorney, sue Richard Laming. For that the defendant, being interested in a certain gas-purifying apparatus, which was being erected at the works of a company, called the 'Great Central Gas Consumers Company,' and in the system of purifying gas thereby, it was agreed between the plaintiffs and the defendant, by an agreement, dated the 7th of June, 1859 (which agreement was also signed on behalf of the said company), as follows:—That, in reference to the said apparatus, the plaintiffs would put the pumps in duplicate, and make them in perfect working order, and pay £1 to the defendant, who would put a proper colander on the two pipes in the disulphuretted liquor-tanks. That the plaintiffs would double the speed of the pumps, the defendant paying the plaintiffs towards the expense, £5. That

on the foregoing works, so far as the same were to be executed by the plaintiffs, being completed to the satisfaction of Mr. Wright, the said company's engineer, whose decision should be conclusive, the defendant would accept the said apparatus as complete between him and the plaintiffs. That the said company consented to give fourteen days from the date of the said agreement for the execution of the foregoing works, the defendant to have the use of the said apparatus, and the use of gas for purification, so far as should not interfere with the operations of the said company, and in the discretion of their engineer or manager, for the term of two months from the expiration of the above fourteen days; that, within six days after the expiration of the two months, the said company's engineer should finally decide whether the defendant's system was efficient and satisfactory, and his judgment in the matter should be absolute and conclusive. That all the materials necessary for the future trial should be provided by the defendant, at his expense, he being found a mechanic and labourer by the said company, at their expense, during the above period of two months. That, if the said company's engineer should decide that the said system was efficient and satisfactory, the said company should thereupon pay to the plaintiffs the sum of £1600; that, if Mr. Wright should decide that the said system was not efficient and satisfactory, the said company should thereupon pay to the plaintiffs the sum of £1100, and the defendant should pay to the plaintiffs the sum of £500; and that all the works, in either case, should become the absolute property of the said company. And the plaintiffs say that the said works in the said agreement mentioned, so far as the same were to be executed by the plaintiffs, were completed to the satisfaction of the said company's engineer; and that the said apparatus was accepted by the defendant according to the said agreement, and the said period of two months in the said agreement had elapsed before the commencement of this suit, and within six days after the expiration of the said period of two months, and before the commencement of this suit, the engineer of the said company finally decided, according to the said agreement, that the said system was not efficient and satisfactory, of which the defendant afterwards, and before the commencement of this suit, had due notice, yet, although the plaintiffs and the said company have respectively done, and been ready and willing to do, all things on their parts necessary to entitle them to claim from and be paid by the defendant the said sum of £500 in the said agreement mentioned, and all things have happened, and all periods of time have elapsed, necessary to entitle the plaintiffs to claim and to be paid the said sum under the same agreement, the defendant has not paid the said sum, or any part thereof, but has therein failed and made default. And the plaintiffs also sue the defendant for moneys payable by the defendant to the plaintiffs upon and by virtue of a certain determination of an engineer, made by him upon and by virtue of a submission made by the plaintiffs and the defendant to his determination whether the system of purifying gas by a certain apparatus was efficient and satisfactory, by which submission the defendant had agreed with the plaintiffs to pay to them the said money if the said engineer should determine that the said system was not efficient and satisfactory, and under and by virtue of which reference and submission, the said engineer did determine that the said system was not efficient and satisfactory, and for work done and materials provided by the plaintiffs for the defendant at his request, money paid by the plaintiffs for the defendant at his request, and money found to be due from the defendant to the plaintiffs on accounts stated between them. And the plaintiffs claim £600." Now, the facts were these: The plaintiffs, down to the month of August, 1859, carried on an extensive business as coal and coke merchants in London and elsewhere, and were in the habit of taking contracts for the making and supply of coke to different companies. The defendant was the inventor and patentee of a process and apparatus for purifying gas, the patent having been granted on the 20th of February, 1856. During the year 1858, the plaintiffs were under a contract with the Great Central Gas Consumers Company to make gas for them at their works at Bow for a term of twenty years from September 29, 1857, which contract was determined by mutual consent on January 29, 1859. In the spring and summer of 1858, the defendant, on several occasions, tested his process by experiments at the company's works. In consequence of these experiments, negotiations took place between the plaintiffs and the defendant for the erection of his apparatus at the company's works, in order that the plaintiffs might use the same for purifying the gas which they were making there under their contract with the company. These negotiations resulted in an agreement made prior to September 28, 1858, between the plaintiffs and the defendant, but not reduced into writing, that the plaintiffs should themselves erect the apparatus, and that the defendant should pay them £500 if his process proved to be a failure. In consequence of the gas company having insisted upon keeping a control by their engineer over the erection of the apparatus, one term of this agreement was, that Mr. Wright, the then engineer of the company, should superintend the erection, and that his decision should be final as to the success or failure of the process. Mr. Wright, who had been previously well-known to the defendant, was the engineer of the company at a yearly salary at the time this agreement was made. The agreement being made, the plaintiffs proceeded to erect the apparatus at the company's works, and expended nearly £2000 in the erection. In March, 1859, they had, as they contended, erected the apparatus according to the terms of the agreement; but the defendant insisted that they had, in various parts of the apparatus, failed to comply with these terms. Disputes on this point continued between them until June, 1859, when, with a view to put an end to them, the company interfered between the parties; and, on the 7th of June, 1859, the following agreement was entered into between the plaintiffs and the defendant, and was also signed on behalf of the said company:—

In reference to Mr. Laming's gas-purifying apparatus now being erected at the Great Central Gas Consumers Works at Bow, Messrs. Prior agree to put the pumps in duplicate, and to make them in perfect working order. Messrs. Prior agree to pay £1 to Mr. Laming, who undertakes to put proper colander on the two pipes in the disulphuretted liquor-tanks. Messrs. Prior agree to double the speed of the pumps, Mr. Laming paying Messrs. Prior towards the expense (£5) say five pounds. It is mutually agreed between Messrs. Prior and Mr. Laming that on the foregoing works, so far as the same are to be executed by Messrs. Prior being completed to the satisfaction of Mr. Wright, the company's engineer, whose decision shall be conclusive, Mr. Laming accepts the apparatus as complete as between him and Messrs. Prior. The company consent to give fourteen days from the present date for the erection of the foregoing works. Mr. Laming to have the use of the apparatus, and the use of gas for purification so far as shall not interfere with the operations of the company, and in the discretion of their engineer or manager, for the term of two months from the expiration of the above fourteen days. Within six days after the expiration of the two months, the company's engineer to finally decide whether Mr. Laming's system is efficient and satisfactory, and his judgment in the matter to be absolute and conclusive. All the materials necessary for the future trials to be provided by Mr. Laming at his own expense. Mr. Laming to be found a mechanic and labourer by the company, at their expense, during the above period of two months. If the company's engineer shall decide that the system is efficient and satisfactory, the company shall, thereupon, pay the Messrs. Prior the sum of £1600. If Mr. Wright shall decide that the system is not efficient and satisfactory, the company shall thereupon pay Messrs. Prior the sum of £1100, and Mr. Laming shall pay Messrs. Prior the sum of £500, all the works and materials in either case to become the absolute property of the company.

(Signed) THOMAS GABRIEL for the company,
RICHARD LAMING,
E. and A. PRIOR,
By H. S. LAW, their attorney,

28, *Coleman Street, June* 7, 1859.

The works so agreed to be executed by the plaintiffs were duly completed by them within the fourteen days mentioned in the agreement; and, on the 17th of June 1859, Mr. Wright gave the following certificate:—

I hereby certify, that the works agreed to be executed by Messrs. Prior, in accordance with an agreement made on the 7th of June, 1859, between the Great Central Gas Company, Richard Laming, and E. and A. Prior, are executed to my satisfaction. A. WRIGHT.

London, June 17, 1859.

On the 23rd of July, 1859, Mr. Wright died without making any further certificate in the matter. The defendant had, previously to the death of Mr. Wright, frequently attended with him at Bow during his experiments, with a view of testing the efficiency of the apparatus. No permanent engineer at an annual salary was appointed by the company to succeed Mr. Wright. Since his death, his duties had been performed by Mr. Harris, the manager of the company's works. The company had, from time to time, while Mr. Wright was their engineer, and since his death, consulted Mr. Barlow, a gas engineer of great experience; and, on August 9, 1859, Alderman Gabriel, the deputy-chairman of the company, acting on behalf of the company, verbally instructed Mr. Barlow to test the apparatus, and report to the company whether it fulfilled the conditions of purifying gas as contained in the agreement of June 7, 1859. Before Mr. Barlow was so instructed, the defendant wrote the following letter to the deputy-chairman, Alderman Gabriel:—

Sir,—In the matter of the new purifying process, now awaiting the appointment of an umpire, if I shall have to do with the company, instead of with Messrs. Prior, who have disqualified themselves for executing the conventions with me by rescinding their contract with the company, I shall be willing and ready to carry out the arrangement entered into with those gentlemen on the basis of the letters passed between us. Will the company have the kindness to inform me whether, by agreement with Messrs. Prior, they have taken upon themselves the position of those gentlemen with respect to me? If they have not, are they willing to negotiate with me, independently of Messrs. Prior, on their original conditions?

With the draft of indenture prepared by the company's solicitors, I have nothing whatever to do. It would complicate my position, as it is not based simply upon the original conditions, besides which it has become necessary now to provide for the changed circumstances introduced by the decease of the late Mr. Wright. He, although an officer of the company, would have been a desirable umpire between Messrs. Prior and myself, but, in a prudential point of view, he ceased to be an unobjectionable umpire upon being charged with deciding whether a certain sum of £500, due to Messrs. Prior, should be paid by his company, or by a stranger. With that prudential consideration against me, I still accepted Mr. Wright for umpire, because I happened, from knowledge of many years, to have an unusual amount of confidence in his personal character. That extreme confidence, however, I cannot in reason be urged to extend to any one of the company's officers who might be named by them for succeeding him as engineer. On this point, I anticipate no difficulty with the company, as there can be no objection to the naming of an independent engineer, in whom both parties will have confidence. There may, however, be some difficulty in agreeing upon the instructions to be given for the guidance of the umpire. My system is to rid the gas of its three chief impurities, leaving its illuminating power as good as when purified in the ordinary manner by oxide of iron and dry lime, and generally to the satisfaction of the umpire. To express this, Mr. Wright used two words—"efficient and satisfactory," I having agreed that, if Mr. Wright shall decide that the system is not efficient and satisfactory, I shall pay the Messrs. Prior the sum of £500. The word "satisfactory" had a definite meaning in Mr. Wright's mind, and that meaning I was satisfied with; but, in the mind of another umpire, the word might have another meaning which, perhaps the company, perhaps myself, might be dissatisfied with. I am of opinion that it would be more safe to both parties to compare the results of my system with the results of other systems. That is to say, let the umpire be instructed to pronounce upon the success of my process only by its purifying the gas as efficiently as any other known process in use, and without nuisance, and at or about the cost originally given as an approximation, say 5d. per ton of coal carbonized, for materials and manual labour. Such a test would be practically easy, and meet all the requirements of the case. It will also be necessary that the umpire receive definite instructions about the machinery to guard against his imputing to my process any possible failure that may be due solely to faulty construction. The justice of this is apparent. I originally proposed to erect apparatus for the trial, at my own charge, on the condition that Messrs. Prior should reimburse my expenses, if the process proved effectual. Finally, it was arranged that Messrs. Prior should erect all the apparatus I should require, and I pay them £500 in event of failure, as compensation for parts that would then be useless to them, by reason of their not working under my patents. Now, it happened that, during the time the apparatus was being constructed, Messrs. Prior, by a convention with the company, ceased to have any interest in the success of my process; that loss of interest resulted in their neglecting to do many things that are very essential to my success, and in their doing other things in a cheap and unworkmanlike manner, so that the apparatus as they have left it, is not sufficient for its purpose, nor trustworthy for the trial. In the arrangement of its parts, so far as they go, I am an approving party; but, whether it is capable of doing its work or not, is a question for engineers, and I stand aloof from answering it.

45, *Park Road, Hampstead, August* 4, 1859. RICHARD LAMING.

To this letter no answer was given. On August 17, 1859, Mr. Barlow went to the company's works, found the defendant there, and, in answer to a question from the defendant, whether he had come on behalf of the company to test the apparatus, informed him that he had, but he did not then or at any other time expressly inform him, nor did any other person inform him, that Mr. Barlow had been appointed by the company as a substitute for Mr. Wright, to certify upon the efficiency of the apparatus. The defendant, on that occasion, at the request of Mr. Barlow, fully explained the details of the apparatus, and the mode of working it, and the apparatus was put into operation under the directions and management of the defendant, in order that Mr. Barlow might have an opportunity of testing it. Mr. Barlow, on that occasion, made an appointment with the defendant to meet him the next day at the works, in order to make another trial of the apparatus. The defendant, however, did not again meet Mr. Barlow at the works. Mr. Barlow attended there on August 18 and 25, but did not on those days test the apparatus. On the latter day, the defendant wrote the following letter to Alderman Gabriel:—

45, *Park Road, Hampstead, August* 25, 1859.

Sir,—As I have not heard from you, in reply to my letter of the 4th inst., I beg to refer you to its contents, and to request to be informed, at the earliest convenience of the company, what arrangement they propose making with respect to the new process of purifying, and its contingent matters? From some observations of the process, made with the apparatus in its imperfect state, I have assured myself of its proving a practically successful process; and I am desirous to take, with the company, whatever further measures may be necessary for its being brought into use.—I have the honour to be, sir, yours obediently, RICHARD LAMING.

Alderman Gabriel, Deputy-chairman of the Great Central Gas Consumers Company.

On August the 27th, Mr. Barlow tested the apparatus again, and, in his judgment, made a fair and sufficient test of its efficiency. The defendant asserted that Mr. Barlow did not, on that occasion, fairly and satisfactorily

test the efficiency of the apparatus, and that the ammonia which he used on the occasion was in an improper state. On the same day, the secretary of the company wrote the following letter, in answer to the defendant's letter of August 25:—

Great Central Gas Consumers Company, 28, Coleman Street, E.C., London, August 27, 1859.

Sir,—Your letter of the 25th, addressed to Mr. Gabriel, was communicated by him to the board yesterday. They desire me, in reply, to say that, according to agreement, they have directed their engineer, Mr. Barlow, to examine into the working of the purifying apparatus, and to report as to its success, according to the terms agreed upon.—I am, your obedient servant,

Richard Laming, Esq. R. M. Massey.

On the same 27th of August, 1859, Mr. Barlow having thus tested the apparatus, and being satisfied that it was not efficient or satisfactory, gave the following certificate:

Great Central Gas-Works, Bow Common Lane, August 27, 1859.

I, the undersigned engineer to the Great Central Gas Consumers Company, do hereby certify that the system of gas purification carried on in the apparatus recently erected upon the company's works at Bow Common Lane, under the direction of Mr. Laming, is not efficient and satisfactory, inasmuch as it does not purify the gas from the carbonic acid and sulphuretted hydrogen contained in it.

Thomas G. Barlow.

This certificate was forwarded by Mr. Barlow to Mr. Massey, the secretary of the company, in the following letter:—

42, *Parliament Street, London, August 27, 1859.*

Dear Sir,—I beg to enclose you a formal certificate, to the effect that Laming's system of purification is not efficient and satisfactory, and shall make a further report on the subject when I have time to draw it up. I have tried the apparatus in all the forms practised by Mr. Laming, and have failed to obtain a clean test at any time.—I am, dear sir, yours truly, Thomas G. Barlow.

R. M. Massey, Esq., Secretary, Great Central Gas Company.

On August 31, the defendant wrote the following letter to the secretary:—

45, *Park Road, Hampstead, N.W., August 31, 1859.*

Sir,—In the present inability of Messrs. Prior to fulfil their engagements with respect to my new purifying process, you will readily understand that I have no inducement to risk anything upon its success unless its adoption be guaranteed by those who have succeeded them in possession of the works. The silence of your letter of the 27th instant, in reply to my direct inquiry upon the subject, leaves me to conclude that the company are not prepared to give such a guarantee upon the terms and conditions stipulated for with the Messrs. Prior, and therefore I regard my case with them at an end.

The company may object to become manufacturers of sulphate of ammonia, and yet be willing to adopt my purification on other terms and conditions. It is also probable that the company will wish to derive all the security against contingencies that it is possible to derive from the two dry purifiers they have ordered to be erected. Taking these circumstances into consideration, and also the fact that the company's officers have already witnessed upon a large scale the perfect purification of the gas from sulphuretted hydrogen by the use of my revivifiable oxide of manganese in dry pumpers, but without admitting any doubt of the perfect success of my process of purification by disulphuretted ammoniacal liquor, I am willing to do as follows:—

I will, at my own cost, perfect the wet-purifying apparatus, by removing the three sets of imperfect pumps put up by the Messrs. Prior, and substitute for them three other sets of pumps that will do effective service; and, I will also brace together all the frames, making them solid and strong. I will, for the full term of my patents, guarantee to the company the undisturbed use of my methods of using the scrubbing apparatus, and of my revivified oxide of manganese process for the new dry purifiers intended to be joined to the outlet of the former, so that the gas may, if requisite, be passed though either set of vessels, or if it be wished, through both, in succession. I will supply, properly prepared for use, all the oxide materials. I will remove them when spent, and pay the cost of the manual labour needed for charging and discharging the purifiers, the work nevertheless being done by the company's workmen, and without any nuisance to the neighbourhood, or lowering of the illuminating power of the gas. I will be answerable for its certain and uniform purifications to any degree of perfection that may be covenanted for.

If this meets the views of the company, I am prepared to name the concessions required in discharge of all claims for royalty, materials, and labour, so that the total cost of the purification shall at once be known as well as its efficiency guaranteed.—I am, sir, yours obediently, Richard Laming.

To the Secretary of the Great Central Gas Consumers Company.

On the same day, a copy of the certificate of Mr. Barlow was forwarded by Mr. Massey to the defendant in the following letter:—

29, *Coleman Street, August 31, 1859.*

Sir,—Enclosed, I beg to hand copy of report from Mr. Barlow, the company's engineer, as to the purifying apparatus.—I am, &c.,

Richard Laming, Esq. R. M. Massey.

On the 3rd of September, 1859, the defendant acknowledged the receipt of the copy of Mr. Barlow's certificate in the following letter:—

45, *Park Road, Hampstead, September 3, 1859.*

Sir,—I beg to acknowledge the receipt of your communication dated the 2nd of September, and also of your previous letter to which it refers, enclosing copy of one to you with certificate written by Mr. Barlow.

With respect to the subject of these several documents, I need at present only remark that I demur to the opinion Mr. Barlow has expressed.—I am, sir, yours obediently, Richard Laming.

R. M. Massey, Esq., Secretary of Great Central Gas Consumers Company.

The plaintiffs knew nothing of this correspondence between the defendant and the company, nor were they present at, nor had they any notice of, Mr. Barlow's experiments. The plaintiffs contended, first, that the certificate given by Mr. Barlow on the 27th of August, 1859, was binding upon the defendant within the meaning of the agreement of the 7th of June, 1859. Secondly, that whatever might be the construction of that agreement, the defendant assented to the appointment of, and adopted Mr. Barlow as the referee to certify as to the efficiency or otherwise of the apparatus. The defendant, on the other hand, contended—First, that the plaintiffs were not entitled to the £500, inasmuch, as Mr. Wright had not decided that the system mentioned in the declaration was not efficient and satisfactory. Secondly, that Mr. Wright was the person appointed by the deed to decide that question, and not any engineer whom the company might think proper to appoint. Thirdly, that looking not only to the agreement declared on, but to the entire transaction of which that agreement formed a part, it was clear that Mr. Wright, and Mr. Wright only, was the referee nominated by the parties. And, fourthly, that even supposing the plaintiffs were correct in the construction which they sought to put upon the agreement, Mr. Barlow never was the engineer of the company within the true intent and meaning of the agreement. The question for the opinion of the court was, whether the plaintiffs were entitled to recover the sum of £500 in the declaration claimed, or any part thereof? If the court should be of opinion that this question should be answered in the affirmative, the judgment entered for the plaintiffs was to stand for £500 (or such sum as the court should name) and costs, including the costs of the special jury. If the court should be of opinion that this question should be answered in the negative, judgment should be entered for the defendant with costs.

Lord Chief Justice Cockburn asked what the defendant was to get in case his apparatus was deemed efficient and satisfactory?

Mr. Bovill replied that the royalty he would derive as patentee would be very profitable to him.

Justice Blackburn observed that the defendant's case had been very ably argued at the sittings after Trinity Term, in 1860.

Mr. Bovill said that a benefit would be derived by all the parties if the patent were successful. If, for instance, it was efficient and satisfactory, the plaintiffs were to be paid £1600 by the company; if otherwise, the company were to pay them £1100, and Mr. Laming was to lose £500. Nothing was more equitable than that arrangement. The ambiguity about it was this, that Mr. Wright died, and that the expression in the 7th article of the agreement was, that "if Mr. Wright should decide," so and so was to be the case. But there the words "Mr. Wright" meant the company's engineer, whoever he might be.

Justice Blackburn thought that the words rather pointed the other way.

Mr. Bovill admitted that there certainly was an ambiguity in the phraseology, and yet, after saying that "if Mr. Wright should decide," the agreement spoke elsewhere of the "engineer or manager."

Justice Blackburn said it was perfectly clear that, at the time the agreement was drawn up, the parties did not contemplate the contingency that Mr. Wright might be dismissed, and that another engineer might be appointed in his place. Nor the contingency, that he might die.

Mr. Bovill observed that it really would be for the interest of all the parties that the apparatus should have been favourably reported upon.

Lord Chief Justice Cockburn said it appeared, from one of the defendant's letters, that he was quite willing to abide by Mr. Wright's decision, because he had confidence in him. Now, when Mr. Wright died, the person who succeeded him must be one clothed with his responsibility, and armed with sufficient authority by the company to act. Mr. Barlow was the gentleman the company had called in, and he was an engineer that gas companies were, no doubt, in the habit very often of consulting. Still, the defendant said that he ought not to be concluded by the report of Mr. Barlow.

Mr. Bovill said that Mr. Barlow was the only engineer the company had at the time.

Lord Chief Justice Cockburn understood the learned counsel to say that they had at present no engineer?

Mr. Bovill replied that such was the case.

Lord Chief Justice Cockburn said it seemed to him that Mr. Barlow had been called in *pro re sola*. Mr. Barlow was, no doubt, a gentleman of great experience, in whose impartiality the fullest confidence might be placed; still, calling in a person by the job to decide upon an apparatus of this importance was a mode of doing business to which the defendant might very reasonably take exception. Mr. Barlow was said to have been verbally instructed, to be really an engineer *ad hoc* on the occasion, and, therefore, Mr. Laming might justly think that he had not been armed with sufficient authority.

Mr. Bovill referred to the case of Mr. Stephenson, and contended that, when an engineer was called in and consulted, he must be considered as the engineer of the company, particularly if no one except the one was brought in for a special purpose like the one to which the attention of Mr. Barlow had been called.

Lord Chief Justice Cockburn said that if the company employed A, B, and C, still, although they might all be the engineers of the company, they would not come within the meaning of the contract.

Justice Blackburn said that besides this, Mr. Laming was to have the use of the apparatus for two months, that Mr. Wright was to have an opportunity during the whole of those two months of seeing whether the apparatus was working satisfactorily, and that the manifest meaning of the contract was not that the efficiency of the process was to be determined by a gentleman who had been suddenly called in.

Justice Crompton observed that by Mr. Wright the decision was to be arrived at, because he was the person who was to see the whole of the works set up, and placed in working order, Mr. Laming superintending and directing the apparatus.

Justice Blackburn thought there was great force in what Mr. Laming said—namely, that he was willing to abide by the decision of Mr. Wright; but that, when it came to be a question as to the decision of Mr. Barlow, who had not had the opportunities of testing the efficiency of the apparatus which had been afforded to Mr. Wright, he would not trust to the opinion of an engineer who had only been consulted for the time being.

Mr. Bovill said that his lordship was merely repeating the arguments of the defendant. It was clearly the interest of the company not to pay £1600 for nothing, and not to pay £1100 for nothing. It was, therefore, important for all parties that the apparatus should be found efficient and satisfactory. It was to be presumed that they would not have entered into the contract, and incurred any expenditure, if they did not see it their interest that the process should turn out to be satisfactory. In fact, it was clearly the interest of all parties that it should have been pronounced efficient. If the facts were as they appeared upon this special case, then Mr. Barlow had been called in to fill the office of the company's engineer at the time the test was applied. The next part of the case was this: The agreement having been made, and Mr. Wright having died, did not the parties continue on the same footing as before with regard to the agreement, and on the understanding they had all subscribed, that a certificate was to be given as to the efficiency or non-efficiency of the apparatus? Now, on that subject all parties agreed that the agreement was to be carried out; and what was the expression made use of in the letter written by the defendant on the 4th of August, 1859? Why, it was this:—"In the matter of the new purifying process now awaiting the appointment of an umpire." Therefore, the defendant then considered that, notwithstanding the death of Mr. Wright, the company could authorize the appointment of another person as umpire; and, accordingly, Mr. Barlow was called in. The defendant admitted that some independent gentleman in place of Mr. Wright should be authorized to act, for he said in the same letter:—"I anticipate no difficulty with the company, as there can be no objection to the naming of an independent engineer in whom both parties will have confidence."

Justice Blackburn said that no doubt that language was used, but then, was the company alone to be the parties to appoint the engineer?

Mr. Bovill thought they might be. This was not a case of antagonistic interests. On the contrary, both parties had the same interest. On the 27th of August, Mr. Barlow tested the apparatus; and now, what was the defendant's objection? He knew that Mr. Barlow tested it; and, because the result was not in his favour, he said that that gentleman had not fairly and efficiently tested it, and that the ammonia which he used on the occasion was in an improper state. But he knew at that time that Mr. Barlow had been examining it, and that he had made a report that it was inefficient as a means of purification. Then followed one or two letters; and, eventually, on the 3rd of September, 1859, the defendant demurred to the report of Mr. Barlow, of course because that report was condemnatory of the apparatus. Would he have demurred, if the report had been in his favour? The view

he (Mr. Bovill) took of the correspondence was this—that the company's engineer was to decide on the efficiency or otherwise of the apparatus, and that Mr. Laming himself took that view of it.

Justice CROMPTON said it must not be forgotten that a new arbitrator, with new functions, had been appointed, and that Mr. Barlow had been appointed by the company alone.

Mr. BOVILL admitted that the material point lay in the construction put by the court upon the agreement.

Justice CROMPTON said that in the letter written by the defendant on the 25th of August he referred to his unanswered letter of the 4th of the same month, and that on the 27th Mr. Barlow was appointed, and on the same day proceeded to test the apparatus. There was no opportunity, therefore, given to the defendant to come to any agreement.

Mr. BOVILL asked what was the conduct of the defendant when Mr. Barlow presented his report? Had he objected previously to Mr. Barlow's appointment? By no means. On the contrary, he had raised no objection to him, although informed that the company had appointed him. On the 27th of August, the report was made; and, on the 3rd of September, the defendant raised his first objection by saying that he demurred to the opinion Mr. Barlow had expressed. It, therefore, appeared that he had not repudiated that gentleman, but that he merely objected to the report he had made.

Justice CROMPTON thought this was a very strange construction to put upon the whole tenour of the defendant's correspondence.

Mr. BOVILL said that the defendant no doubt agreed in thinking Mr. Barlow a very excellent engineer. He made no complaint on that head; but what he did complain of was, that Mr. Barlow had used improper materials. He said that the ammonia used was in an improper state. He did not complain and say that Mr. Barlow had no right to give a certificate: he simply complained of the improper ammonia.

Justice BLACKBURN asked what the learned counsel would say, supposing there had been a case of dispute between a horse-dealer and another, and that the animal had not been properly tested?

Mr. BOVILL submitted that there was no analogy between the cases. The defendant did not object to Mr. Barlow, but merely complained of the use of the improper ammonia.

Lord Chief Justice COCKBURN asked the number of the page to which the learned counsel was referring?

Mr. BOVILL replied that it was page 8. If their lordships referred to the previous page, they would observe that the defendant saw Mr. Barlow on the 17th, that he was then told that Mr. Barlow had come to test the apparatus, that he went to the works and explained the whole thing to Mr. Barlow, that the apparatus was put into operation, and its mode of working examined, in order that Mr. Barlow might have an opportunity of fully testing it.

Justice HILL observed that Mr. Barlow was not at that time appointed in place of Mr. Wright.

Lord Chief Justice COCKBURN said, that to show the defendant did not consider Mr. Barlow's report binding on him, he asked an answer to his letter of the 4th in his letter of the 25th of August, and then he said very plainly afterwards that not only did he object to Mr. Barlow, but he objected to the mode in which that gentleman had made the test.

Justice BLACKBURN said that no doubt Mr. Laming would have been very glad if Mr. Barlow had used the proper test.

Mr. BOVILL asked their lordships to consider how it would be, supposing Mr. Barlow to have reported that the apparatus was efficient and satisfactory?

Lord Chief Justice COCKBURN said that no doubt in such a case the defendant would not have made any objection. The company ought to have taken care, before they appointed Mr. Barlow to test the apparatus, to have Mr. Laming's assent to that appointment. They knew that Mr. Wright was dead.

Mr. BOVILL said the company, and all parties concerned, believed that they were appointing a very proper person in Mr. Barlow, who was a gentleman well known as an eminent gas engineer. To Mr. Barlow, the defendant explained the whole of the apparatus. For what purpose? Why, in order that Mr. Barlow might give the certificate. The defendant was present, and he explained all to Mr. Barlow, for the purpose of enabling the latter to make the test, and furnish the certificate.

Lord Chief Justice COCKBURN said the learned counsel seemed to forget what the defendant had stated in his letter of the 4th of August, respecting the precise matter upon which the report was to be made. He there referred to the meaning of "efficient and satisfactory," which he believed was in Mr. Wright's mind; and to that letter he obtained no reply.

Mr. BOVILL reminded their lordships that it was not until after Mr. Barlow had made his report, that the defendant found fault with the ammonia which was used, and demurred to Mr. Barlow's opinion. He might have asked for further inquiry. He raised no objection to Mr. Barlow previously. He would have accepted Mr. Barlow's certificate if it were in his favour; but, because it was unfavourable, he chose to repudiate it. There was simply a substitution of Mr. Barlow for Mr. Wright, under the circumstances of Mr. Wright's death.

Lord Chief Justice COCKBURN pronounced judgment. He said the court would not call upon the learned counsel for the defendant to reply. It appeared, according to the terms of the agreement, that the defendant was to be bound by the certificate of Mr. Wright, the company's engineer. Looking at the whole of the contract, he (the Lord Chief Justice) thought that, when the company's engineer was mentioned, Mr. Wright was meant, and that the engineer spoken of was not an engineer in general, but Mr. Wright in particular. It was not any one who might be called in, but it must be somebody who was the permanent officer of the company. That being so, Mr. Barlow's certificate did not come up to the meaning of the agreement. There was nothing in the subsequent conduct of the defendant which amounted to an understanding on his part that Mr. Barlow was a person by whose decision he was to be bound. In his letter of the 4th of August, he adverted to the point, and said he was ready to submit to the decision of some other person who should be appointed as arbitrator; but then on certain conditions. He said he knew the meaning which Mr. Wright would attach to the "efficient" and "satisfactory" working of the apparatus, and that he was not at all sure that any other person who might be called in would understand that meaning in the same light as Mr. Wright understood it. Therefore, he proposed that any one who was called in should have specific instructions given him. That letter had never been answered directly or indirectly by the company; but they directed Mr. Barlow to test the apparatus. It appeared that upon the occasion the defendant attended and explained the process, and the mode by which it was to be worked. He (the Lord Chief Justice) did not think that that could be construed to amount to an assent on his part that he would be bound by the certificate of Mr. Barlow, the latter not being in a position to certify according to the terms of the agreement.

Mr. Justice CROMPTON said that he fully coincided in the opinion of the Lord Chief Justice, for the reasons his lordship had assigned.

Justices HILL and BLACKBURN also concurred in the judgment of the Lord Chief Justice.

COURT OF COMMON PLEAS.

WEDNESDAY, MAY 22.

(*Sittings in Banco, before Lord Chief Justice* ERLE *and Justices* WILLES *and* BYLES.)

HOLLIDAY *v.* THE VESTRY OF ST. LEONARD, SHOREDITCH.

Serjeant SHEE, Mr. FRANCIS, and Mr. GALWAY appeared for the plaintiff; and Mr. RAYMOND and Mr. WATKIN WILLIAMS, for the defendants.

This was an action brought against the vestry of Shoreditch, for damage done to the plaintiff, by reason of some stones being left in one of the public streets in that parish, which caused a cart in which the plaintiff was riding to be upset. The declaration stated that the defendants, on the 12th of September, in a certain street called Shaftesbury Street, in the parish and county aforesaid, laid, put, and placed a quantity of stones on and above the level of the surface of the said street, and wrongfully, carelessly, and negligently suffered and permitted the same to be left and remain in the said street, on and above the level of the surface thereof, during the night—the same being a dark one—without a sufficient or any light or signal at or near to the said stones, to cause the same to be seen by persons driving in and along the street, and without having any watchman or person to take care of the same, and without having any board or protection, and without taking any reasonable or proper means or precautions to prevent the said last-mentioned persons from driving against or upon the said stones, and being injured thereby, and by means of the premises, the plaintiff, who was then riding and being driven in a cart in the said street on the said night was driven, and the said cart ran against and came into collision with and upon and against the said stones, and the defendant was cast and thrown from and out of the said cart, down to and upon the ground, and was much hurt, bruised, wounded, and injured, and was put to expense, to wit, £150, in and about endeavouring to get healed, &c. To this declaration, the plaintiffs pleaded "Not guilty;" and the action was tried before Lord Chief Justice Erle and a special jury at the sittings after last Hilary Term, when a verdict was found for the plaintiff, leave being reserved for the defendants to move to enter the verdict for themselves, or for a nonsuit, on the ground that there was no evidence to support the verdict, and also that there was no evidence to show that the defendants were liable. A rule having been obtained accordingly,

Serjeant SHEE now showed cause against it. He said the question was, whether the surveyor was not the servant of the parish; and as such whether he did not employ the workmen? If he was, then this case came within the rule of law, that where a person employed men to do any act and damage occurred thereby, the person so employing was liable, and the vestry therefore were liable. Then, as to their being no funds out of which damages could be paid, it did not follow that, because the Act did not show out of what funds the damages should come that, therefore, there was no liability. The learned counsel quoted several cases in support of his view.

Mr. FRANCIS and Mr. GALWAY followed on the same side, and cited the case of *Scott v. the Mayor of Manchester* as a direct authority. There an action was brought against the defendants, a municipal corporation, who were empowered by Act of Parliament to construct gas-works and supply gas, for damage done to the plaintiff, the declaration alleging that they employed workmen to lay down the pipes, who so negligently conducted themselves that a piece of metal was projected against the plaintiff, and it was held that the defendants were liable. Surely, then, it must be equally of advantage to the parish of Shoreditch that their roads should be well paved as to the inhabitants of Manchester to have gas, and, therefore, that case is an authority to show the defendants liability. In *Jones v. Bird*, which was an action brought against the defendants, who were employed under the Commissioners of Sewers, Justice Bayley said—"It is contended that the defendants are protected, if they acted *bonâ fide*, and to the best of their skill and judgment; but that is not enough. They are bound to conduct themselves in a skilful manner; and the question was properly left to the jury to say whether the defendants had done all that any skilful person could reasonably be required to do in such a case?" Numerous other cases were also referred to.

Mr. RAYMOND in support of the rule, submitted on the authority of Chitty on pleading, that trustees and commissioners acting gratuitously in the execution of Acts of Parliament for the benefit of the public, and intrusted with the conduct of public works, were not liable for injury occasioned by the negligence, or unskilfulness of workmen and contractors necessarily employed by them in the execution of the works. He did not know whether his learned friends on the other side would contend that that was not law, or that the present case did not come under it.

Mr. WATKIN WILLIAMS said the case of *Hall v. Smith* was an authority in favour of the defendants, and had been recognized in the later cases. There it was held that commissioners intrusted with the execution of public works were not liable for damages arising in the execution of those works. It was also recognized in the case of *Deman v. Findlater* which showed that what was laid down in Chitty was good law. Other cases were also deferred to in support of the rule.

Lord Chief Justice ERLE, in delivering judgment, said: I am of opinion that this rule should be made absolute. The action was brought for injury sustained by the plaintiff by reason of his being upset out of a cart over a heap of stones left on the highway, by workmen employed by the surveyor who was appointed by the defendants (the vestry of Shoreditch) to look after the highways in the parish; and the question of law which we have to decide is, whether the members of the vestry are liable for the damage? The vestry acted under the provisions of an Act of Parliament. The men employed by their surveyor did the wrong which occasioned the damage. Now it is agreed on both sides that if a private individual had left these stones he would have been liable, and the question is, whether persons who give their services gratuitously are liable, they being ignorant of the work which was going on, and not giving their attention to it? I am of opinion that they are not. The principle has been recognized, and the law has for a very long time been established, that persons discharging a public duty and acting gratuitously, and having no share or participation in the wrong done, are exempted from liability. In the case of *Hall v. Smith*, which is the first of a long string of authorities, it was held that commissioners intrusted with the conduct of public works were not liable in damages for an injury occasioned by the negligence of artificers employed under their authority, provided they were doing that which by Act of Parliament

they are empowered to do. And this has been held to be the law down to the case of *Duncan v. Findlater*, which was an appeal to the House of Lords against the decision of the Court of Session in Scotland; and the House of Lords, reversing the decision of the Scotch court, held that trustees appointed under a public road Act were not responsible for an injury occasioned by the negligence of the men employed in making or repairing the road. In that case, the Lord Chancellor, referring to the difference between the Scotch and English law, said, "It is important to preserve the law of Scotland where it really differs from that of England; but, where that is not so, and no principle of conflicting law is involved, it is a reproach to any system of law that there should be, in matters of the same kind, and on subjects of the same legislation, a different rule of construction applied in one part of the kingdom and in another." Mr. Williams has drawn our attention to the fact that, in the above case, no evidence whatever was offered to connect the trustees directly with the cause of the accident in question; and that being so, that the House of Lords held that they were not liable. This is the law under which the present defendants come, they being guilty of no personal default. As to the case of the *Itchen Floating Bridge Company v. the Local Board of Health of Southampton*, which was relied upon by the plaintiff, the distinction between that and the present case is, that in that case it was implied by the Act under which the board acted that an action for a wrong might be maintained against them. Then the Manchester case does not fall within the rule, as there, although the defendants, who were a municipal corporation, individually acted gratuitously, yet the corporation and the township derived a profit from the carrying on of the works. The case of *Gibbs v. the Trustees of the Liverpool Docks* is somewhat similar, as although it was not there said that the trustees had any profit, yet vessels coming into the docks had to pay tolls, and as the trustees received money for the accommodation, they had no right, with the knowledge of the docks being in a dangerous condition, to allow them to continue so. As to the cases of *Boulton v. Crowther* and *Sutton v. Clarke*, they show that where persons do that which they are authorized to do by Act of Parliament, although damage accrues to private individuals in consequence of such acts, yet as long as they are not guilty of negligence, they are not liable, and it would be a contradiction to empower them to do certain things, and then say they should not do them; but, in exercising such powers, they must take care not to act wantonly or oppressively. The case of *Duncan v. Findlater* is an express authority that persons acting gratuitously as a public body are not, as in the present case, to be held responsible; and I think, therefore, that this rule should be made absolute.

The other judges concurring, the rule was made absolute.

Miscellaneous News.

METROPOLITAN BOARD OF WORKS.

FRIDAY, JUNE 7.

THE METROPOLIS GAS ACT, 1860.

At a Meeting of this Board, held at the Office, Spring Gardens—J. THWAITES, Esq., in the chair,

Mr. POLLARD, the clerk of the board, read the following communication from the vestry of St. Pancras, in reference to the costs of the Metropolis Gas Act, 1860:—

PARISH OF ST. PANCRAS, IN THE COUNTY OF MIDDLESEX.

At a quarterly meeting of the vestrymen of the said parish, held at the Vestry-hall, King's Road, Pancras Road, on Wednesday, the 5th day of June, 1861, Mr. Churchwarden Stockton in the chair, and eighty other vestrymen present,

The report of the solicitor, Mr. Cooper, as to the taxation of the bills of costs incident to the passing of the Metropolis Gas Act, 1860, was read, which taxation he had attended, in accordance with the instructions of the vestry on the 20th of February last.

The report (which was similar to that presented by Mr. Rogers to the Westminster Board) was ordered to be entered on the minutes.

Mr. R. ECKETT stated that the subject referred to in the report now read, had been brought under the notice of the finance committee. He did not know that anything improper was chargeable to any one, but the parish of St. Pancras, and some other parishes, had advanced considerable sums of money on account of the expenses incurred in obtaining the Metropolis Gas Act. Other metropolitan parishes had not so contributed; and it was, therefore, desired that there should be an equitable adjustment, and that the parishes which had so contributed should receive credit for what they had paid, in the settlement of the account which the board was required to pay for obtaining the said Act.

The communication was again referred to the finance committee.

A similar letter was read from Mr. Jebb, clerk to the Westminster Board of Works, enclosing a copy of Mr. Rogers' report, as given in last JOURNAL, relative to the taxation of the costs of the Metropolis Gas Act, 1860; which was also referred to the finance committee.

An application was read from the Surrey Consumers Gas Company, requesting the sealed permission of the board to erect a gas-tank over the portion of the southern low-level sewer, recently constructed through the company's works at Deptford.

The permission was granted.

ON THE COLOURING MATTERS DERIVED FROM COAL-TAR.

BY MR. W. H. PERKIN., F.C.S.

[A Lecture delivered before the Chemical Society on Thursday, May 16, 1861.]

The subject which I have the honour of bringing before you this evening is one which is remarkable for the very rapid progress it is making. Previous to the year 1856, the colouring matters derived from coal-tar products were practically unknown; but, owing to recent discoveries, they are now enumerated amongst the most important colouring matters employed. It is not my intention to enter into a discussion respecting the numerous patents that have been taken out for the production and application of coal-tar colours, nor yet to enter into the practical details of their manufacture; but to notice more particularly their various chemical characters, and also to speak of the methods employed for their application to the arts. I shall endeavour to bring before you all the principal coloured products obtainable from the derivatives of coal-tar—both those which are practically employed by the dyer and printer, as well as those which still remain as chemical curiosities only. I may mention that the latter class of compounds is more extensive than the former, and also that many of the colouring matters in it are likely to remain so, for reasons to be mentioned presently.

The coal-tar products which have, up to the present, yielded colouring matters, are numerous. The following is a list of the most important, which are obtained either directly or indirectly from coal-tar:—namely, aniline and its homologues, carbolic acid, chinoline or quinoline, naphthaline, and pyrole bases.

I will commence by speaking of the first and most important of these products, and its derivatives,—namely, Aniline.

Aniline was discovered in 1826 by Unverdorben. The original method for its preparation was by digesting indigo with hydrate of potassium, and subjecting the resulting product to distillation. Aniline was also obtained from the basic oils of coal-tar; but the process which is now employed for its preparation is a remarkable instance of the manner in which abstract scientific research becomes, in the course of time, of the most important practical service. It was Faraday who first discovered benzole; he found it in oil-gas. After this, it was obtained by distilling benzoic acid with baryta, which result determined its formula, and was the cause of it being called *benzole*. After this, Mansfield found it to exist in large quantities in common coal-tar naphtha, which is the source from which it is now obtained in very large quantities. Benzole, when studied in the laboratory, was found to yield, under the influence of nitric acid, nitrobenzole. Zinin afterwards discovered the remarkable reaction which sulphide of ammonium exerts upon nitrobenzole, converting it into aniline. And, lastly, Béchamp found that nitrobenzole was converted into aniline when submitted to the action of ferrous acetate. It is Béchamp's process which is now employed for the preparation of aniline by the ton. Had it not been for the investigations cited above, the beautiful aniline colours now so extensively employed, would still remain unknown. When I discovered aniline purple, nitrobenzole and aniline were only to be met with in the laboratory; in fact, half a pound of aniline was then esteemed quite a treasure, and it was not until a great deal of time and money had been expended that I succeeded in obtaining this substance in large quantities, and at a price sufficiently low for commercial purposes.

The colouring matters obtainable from aniline are numerous. They are the following:—Aniline purple, violine, roscine, fuchsine, alpha aniline purple, bleu de Paris, nitroso-phenyline, dinitraniline, and nitro-phenyline diamine.

Aniline Purple, generally known as Tyrian Purple, Mauve, Phenamine, Indisine, &c.—It has been known for many years that the hypochlorites react on aniline and its salts, producing a purple-coloured solution; in fact, hypochlorites are the distinguishing test for aniline; but nothing definite was known of this purple-coloured solution, it being simply stated that aniline produced, with hypochlorites, a purple-coloured liquid, but that this colour was very fugitive. As many very absurd statements have been made respecting the discovery of aniline purple, I will just briefly mention how it was that I first became acquainted with it.

In the early part of 1856, I commenced an investigation on the artificial formation of quinine. To obtain this base, I proposed to act on toluidine with iodide of allyle, so as to form allyle-toluidine, which has the formula—

$$\left.\begin{matrix} C_7H_7 \\ C_3H_5 \\ H \end{matrix}\right\} N = C_{10}H_{13}N,$$

thinking it not improbable that, by oxidizing this, I might obtain the desired result; thus—

$$\underbrace{2\,(C_{10}H_{13}N)}_{\text{Allyle-toluidine.}} + O_2 = \underbrace{C_{20}H_{24}N_2O_2}_{\text{Quinine.}} + H_2O.$$

For this purpose, I mixed the neutral sulphate of allyle-toluidine with bichromate of potassium; but, instead of quinine, I obtained a dirty reddish-brown precipitate. Nevertheless, being anxious to know more about this curious reaction, I proceeded to examine a more simple base under the same circumstances. For this purpose, I selected aniline, and treated its sulphate with bichromate of potassium. This mixture produced nothing but a very unpromising black precipitate; but, on investigating this precipitate, I found it to contain the substance which is now, I may say, a commercial necessity—namely, aniline purple.

The method adopted for the preparation of aniline purple is as follows:—Solutions of equivalent proportions of sulphate of aniline and bichromate of potassium are mixed, and allowed to stand till the reaction is complete. The resulting black precipitate is then thrown on a filter, and washed with water until free from sulphate of potassium. It is then dried. This dry product is afterwards digested several times with coal-tar naphtha, until all resinous matter is separated, and the naphtha ceases to be coloured brown. After this, it is repeatedly boiled with acohol to extract the colouring matter. This alcoholic solution, when distilled, leaves the colouring matter in the bottom of the retort as a beautiful bronze-coloured substance.

The aniline purple prepared according to the process just described, although suitable for practical purposes, is not chemically pure. If required pure, it is best to boil it in a large quantity of water, then filter the resulting coloured solution, and precipitate the colouring matter from it by means of an alkali. The precipitate thus obtained should be collected on a filter washed with water until free from alkali, and dried. When dry, it is to be dissolved in absolute alcohol, the resulting solution filtered, and then evaporated to dryness over the water-bath. Thus obtained, aniline purple appears as a brittle substance, having a beautiful bronze-coloured surface; but, if some of its alcoholic solution be evaporated on a glass plate, and viewed by transmitted light, it appears a beautiful bluish violet colour. If considerable quantities of an alcholic solution of the colouring matter, containing a little water be evaporated to dryness, the surface of the colouring matter next to the evaporating dish, when detached, often possesses a golden-green appearance. Aniline purple is difficultly soluble in cold water, although it imparts a deep purple colour to that liquid. It is more soluble in hot water, but its hot aqueous solution, when left to cool, assumes the form of a purple jelly. It is very soluble in alcohols, though nearly insoluble in ether and hydrocarbous. Aniline dissolves it readily. In properties it seems to be slightly basic, as it is more soluble in acidulated than in pure water. Alkalies and saline substances precipitate it from its aqueous solution as a dark purplish-black powder. Bichloride of mercury precipitates it in a very finely-divided state. A little of this precipitate, which appears to be a double compound of chloride of mercury and colouring matter, when suspended in water and viewed by transmitted light, appears of a blue or violet colour. If a small quantity of hydrate of potassium or sodium be added to an alcoholic solution of the colouring matter, it causes it to assume a violet tint, but without effecting any change in the colouring matter itself. Ebullition with alcoholic potash does not decompose it. Aniline purple dissolves in concentrated sulphuric acid, forming a dirty-green solution. This, when slightly diluted, assumes a beautiful blue colour. Excess of water restores it to its original purple colour. I have had a specimen of this colouring matter heated for an hour to 100 centigrade, with Nordhausen sulphuric acid without suffering decomposition, being restored to its original colour by means of water, and possessing precisely the same properties as it had before being subjected to this powerful agent. Hydrochloric acid acts upon it in the same manner as sulphuric acid. It is decomposed by chlorine, and also by fuming nitric acid. Bichloride of tin is without action upon it. Powerful reducing agents have a peculiar action

upon this colouring matter, somewhat analogous to the action of reducing agents on indigo. An alcoholic solution of sulphide of ammonium, when mixed with an alcoholic solution of the colouring matter, causes it to assume a pale, slightly brownish colour. This solution, when brought in contact with the atmosphere, instantly assumes its beauty and intensity of colour. An alcoholic solution of the colouring matter, when mixed with a little protoxide of iron, changes to a pale-brown colour. This solution also becomes purple when exposed to the action of the atmosphere. Sulphurous acid does not affect the colour of this substance.

The colouring matter forms a remarkable compound with tannin. When an aqueous solution of the colouring matter is mixed with a solution of tannin, precipitation takes place. The precipitate thus formed, after having been well washed, no longer possesses the properties of the pure colouring matter. It is insoluble in water. Like the pure colouring matter, it dissolves in concentrated sulphuric acid, forming a dirty-green liquid; but, on adding an excess of water to this solution, the new compound is precipitated unchanged. This compound is rather duller in colour than the pure colouring matter itself. Aniline purple, when agitated with a little moist binoxide of lead, is transformed into roseine. This colouring matter is remarkable for its intensity—a few grains of it colouring a considerable quantity of spirits of wine.

Violine.—This colouring matter, which is a product of the oxidation of aniline, was first obtained by Dr. David Price. He prepares it by heating an aqueous liquid containing two equivalents of sulphuric acid, and one equivalent of aniline, to the boiling-point, and then adding one equivalent of binoxide of lead, boiling the mixture for some time, and filtering it whilst hot. The filtrate, which is of a dark purple hue, is boiled with potash, both to separate the excess of aniline, and also to precipitate the colouring matter. When all the free aniline is volatilized, the residue is thrown on a filter, and slightly washed with water, and then dissolved in a dilute solution of tartaric acid. This solution after filtration is evaporated to a small bulk, refiltered, and then precipitated by means of an alkali. Thus obtained, violine presents itself as a blackish-purple powder, which, when dissolved in alcohol, and evaporated to dryness, appears as a brittle, bronze-coloured substance, similar to aniline purple, but possessing a more coppery-coloured reflection. It is more insoluble in water than the preceding colouring matter; it is very soluble in alcohol, but insoluble in ether and hydrocarbons. These solutions possess a colour somewhat similar to that of the field violet. Concentrated sulphuric acid dissolves it, forming a green solution, but excess of water restores it to its original colour. Like aniline purple, reducing agents deprive it of its colour, but which is restored by the action of the atmosphere. Tannin produces an insoluble compound with it; when agitated with a small quantity of binoxide of lead, it is converted into aniline purple; excess of this reagent changes it into roseine.

Roseine.—This substance nearly always accompanies aniline purple, though in very small quantities. It was first noticed publicly by C. Greville Williams, and afterwards by Dr. David Price. Williams used manganates for its preparation, but Dr. David Price prepared it by means of binoxide of lead. His process is as follows:—To a boiling solution of one equivalent of sulphate of aniline, two equivalents of binoxide of lead are added, and the mixture boiled for a short time. The rose-coloured solution is then filtered, and the filtrate evaporated to a small bulk, which causes a certain amount of resinous matter to be separated. This evaporated solution is then filtered, and the colouring matter precipitated by means of an alkali; it is then collected on a filter, slightly washed, and then dried. The colouring matter thus prepared readily dissolves in alcohol, forming a fine crimson-coloured liquid, which, when evaporated to dryness, leaves the colouring matter as a dark brittle substance, having a slightly metallic reflection. It is much more soluble in water than either aniline purple or violine; but, like them, it is insoluble in hydrocarbons, and is more soluble in acids than in neutral liquids. Concentrated sulphuric acid dissolves it, forming a green solution; excess of water restores it to its original colour. It forms a compound with tannin, and is also deodorized, or nearly so, by powerful reducing agents.

The three colouring matters just mentioned, namely, aniline purple, violine, and roseine, are evidently closely allied, for they have nearly the same properties. They are all formed under similar circumstances, namely, by the action of oxidizing agents in the presence of water; they are all slightly soluble in water, though as the shade of colour becomes redder, so their solubility increases; alkalies precipitate them from their aqueous solutions; concentrated sulphuric acid dissolves them, forming green solutions, which excess of water restores to the original colour of the colouring matters; powerful reducing agents deprive them of their colour, or nearly so; but it is again restored by the influence of oxygen; and, lastly, tannin forms insoluble compounds with them all.

Fuchsine or Magenta.—This beautiful product, which is often improperly called roseine, is a member of an entirely different series of compounds from the foregoing, being formed under very different circumstances, and possessing very different properties. This colouring matter was first observed by Natanson, in 1856, when studying the action of chloride of ethylene on aniline, and afterwards, shortly before it was practically introduced into the arts, by Dr. Hofmann, when preparing cyantriphenyle-diamine by the action of bichloride of carbon on aniline. It was M. Verguin who first brought it forward as a dyeing agent, and who, I believe, taught manufacturers how to prepare it on the large scale. Fuchsine is invariably formed at a temperature ranging from 170 to 190 centigrade. It is produced from aniline by the action of reducible chlorinized, brominized, iodized, or fluorized substances, as well as by weak oxidizing agents. The substances used for its preparation on the large scale are perchlorides of tin and of mercury, and the nitrates of mercury. It has also been prepared with bichloride of carbon.

Preparation of Fuchsine by the Action of Bichloride of Tin on Aniline.—Aniline combines with bichloride of tin, evidently producing a double compound. This product is a white substance, and may be prepared by adding to aniline, bichloride of tin in the anhydrous states, or dissolved in water. Anhydrous bichloride of tin combines with aniline with great energy to form this compound. To prepare fuchsine from this double compound, it is necessary that it should be free from water, or nearly so; therefore, anhydrous chloride of tin is generally employed for its preparation. The process adopted is as follows:—Anhydrous bichloride of tin is slowly added to an excess of aniline, the mixture being constantly stirred, and the pasty mass thus formed gradually heated. As the temperature increases, it becomes quite liquid and also brown in colour. As soon as the temperature nearly approaches the boiling point of the mixture, it rapidly changes to a black-looking liquid which, when viewed in thin layers, presents a rich crimson colour. This is kept at its boiling point some time, and then well boiled with a large quantity of water. By this means, the principal part of the colouring matter is extracted, together with considerable quantities of hydrochloride of aniline. The residue is a solid of brown colour, and contains considerable quantities of tin in the form of a proto-compound. The aqueous solution of the colouring matter and hydrochlorate of aniline is then boiled, so as to volatilize any free aniline it may contain, and then saturated with chloride of sodium. The chloride of sodium causes the colouring matter to separate as a semi-solid, pitchy substance of a golden-green aspect, while the hydrochlorate of aniline remains in solution. The colouring matter thus obtained may be further purified by digestion with benzole, which dissolves out a certain amount of resinous matter.

Preparation of Fuchsine by the Action of Nitrate of Mercury on Aniline.—When protonitrate of mercury is left in contact with aniline for some time it forms a white pasty mass; but when carefully heated to 170° or 180° centigrade, it reacts upon it, forming a brown liquid, which gradually changes till of a dark crimson colour. At the same time, the whole of the metal of the mercury-salt collects at the bottom of the vessel the experiment is conducted in. This product, when separated from the metallic mercury and allowed to cool, becomes semi-solid, being filled with crystals of nitrate of aniline. To purify this product, it is best to dissolve out the nitrate of aniline it contains in a small quantity of cold water, and then to boil the remaining product several times with fresh quantities of water until the principal of the colouring matter is extracted, and filter the resulting aqueous solutions while hot. On cooling, the solutions will deposit the colouring matter as a golden-green tarry substance, from which benzole separates a small quantity of a brown impurity, leaving the colouring matter as a brittle solid.

I have briefly described the above processes, because they may to some extent be regarded as types of most of the methods employed for the production of this colouring matter—the first representing its formation by the action of reducible chlorides upon aniline, and the latter by the influence of weak oxidizing agents.

Fuchsine is undoubtedly an organic base, and a more powerful one than is generally supposed. The product obtained from aniline by means of bichloride of tin is hydrochlorate of fuchsine, and that obtained by the oxidizing action of nitrate of mercury is the nitrate of fuchsine. My reason for stating this is, that, on examining the colouring matter obtained by chloride of tin, I found it to contain large quantities of combined hydrochloric acid, and, when nitrate of mercury was used, considerable quantities of combined nitric acid; therefore, I conclude that the former is the hydrochlorate, and the latter the nitrate.

Fuchsine is separated from its salts by precipitation with a small quantity of ammonia. When freshly precipitated, fuchsine is a red bulky paste, which, when dry, contracts, forming a purplish red powder. It is difficultly soluble in water, though tolerably soluble in alcohol; it is not soluble in ether or hydrocarbons; a small quantity of hydrochloric acid causes it to dissolve freely in hot water; but an excess of either hydrochloric acid or sulphuric acid dissolves it, forming a brownish-yellow liquid from which ammonia separates it unchanged. By this reaction, it may be distinguished from rosine, which dissolves in strong sulphuric acid, producing a green liquid. Caustic alkalies, or ammonia in excess, partially precipitate fuchsine from its salts; but, at the same time, dissolve a considerable quantity of it, forming nearly colourless liquids. Acetic acid added to these alkaline solutions restores the colour of the fuchsine; and, if the liquids are concentrated, the base precipitates as a red, flocculent substance. An alcoholic solution of fuchsine, when evaporated to dryness, leaves the colouring matter as a brittle mass, having a remarkably beautiful golden-green metallic reflection. By transmitted light, it has a red colour. M. Béchamp has analyzed carefully-prepared specimens of fuchsine, and found it to have the formula $C_{12}H_{12}N_2O$. This hydrochlorate he found to contain an amount of hydrochloric acid, corresponding with the formula $C_{12}H_{12}N_2O$, H Cl. He also examined the hydrochloroplatinate, which is a purple precipitate; it has the formula $C_{12}H_{12}N_2O$ H Pt Cl_3. The existence of oxygen in this base is remarkable, because, in many instances, it is produced from agents which do not contain a trace of oxygen—as, for example, bichloride of tin and aniline. The only way I can account for the presence of oxygen in the product analyzed is, that it was a hydrate; thus:—

$$\underbrace{C_{12}H_{12}N_2O}_{\text{Béchamp's fuchsine.}} = \underbrace{C_{12}H_{10}N_2}_{\text{Anhydrous fuchsine.}} + \underbrace{H_2O}_{\text{Water.}}$$

This is, perhaps, to some extent, confirmed by an experiment I made with iodaniline. I find that iodaniline, when heated, yields fuchsine. This change can only be expressed thus:—

$$\underbrace{2\,(C_6\,[H_6I]\,N)}_{\text{Iodaniline.}} = \underbrace{C_{12}H_{10}N_2}_{\text{Anhydrous fuchsine.}} + 2\,HI$$

But, supposing the fuchsine examined by M. Béchamp to have been a hydrate, it is remarkable that its hydrochlorate, and, more particularly, its hydrochloroplatinate, should also be hydrates. But, as our knowledge of this body is as yet but scanty, we must wait for the accumulation of facts before we can form any fixed opinion respecting its constitution. The compounds investigated by M. Béchamp appear to be uncrystallizable. Some time back, I had upwards of 100 gallons of a hot, aqueous solution of this colouring matter, which had been prepared by means of nitrate of mercury. This solution, on standing until cold, deposited a considerable quantity of colouring matter in the form of small octahedra, having a most beautiful green metallic reflection. Reducing agents decolourize fuchsine, but the oxygen of the atmosphere restores it to its original colour. If an alcoholic solution of fuchsine be left in contact with sulphide of ammonium until decolourized, or nearly so, and then exposed to the atmosphere, its colour is immediately restored; but, if left to stand for several days, and then submitted to the atmosphere, several hours elapse before it assumes its original colour. Like aniline purple, fuchsine is a very intense colouring matter. Tannin precipitates both fuchsine and its salts, forming difficultly soluble substances. Bichloride of mercury also precipitates this base and its salts, forming double compounds. When preparine fuchshine by means of bichloride of tin, or more particularly when using nitrate of mercury, there are two other colouring matters produced, one possessing an orange colour, and the other a purple hue. It is on account of the presence of the former that some samples of commercial fuchsine possess a scarlet character of colour. Of this orange-colouring matter, scarcely anything is known. It is not precipitated from these salts by means of alkalies. Of the purple-colouring matter, little is also known. It is formed at the same time as fuchsine, but in very small quantities, and from which it is difficult to separate perfectly. Its properties are similar to those of fuchsine. It dissolves in concentrated sulphuric acid, forming a reddish-brown solution, from which part of the colouring matter is separated by dilution with water. Hydrochloric acid dissolves it, forming a dirty, yellowish-red liquid.

(To be continued.)

DR. LETHEBY'S REPORT ON THE GAS SUPPLIED BY THE GREAT CENTRAL COMPANY.—At a meeting of the City Commission of Sewers, held at Guildhall, on the 4th inst., Dr. Letheby reported on the illuminating power and chemical quality of the gas supplied to the city by the Great Central Gas Consumers Company, during the quarter which has just expired. He stated that the gas had been tested at two places,—viz., at the laboratory of the London Hospital, and at his laboratory in Finsbury Square. At the first named place, there had been 232 experiments, and at the last 109, making in all 341 experiments on the illuminating power of the gas. Each experiment was the means of ten observations, and the results are as follow:—At the London Hospital, the illuminating power of the gas was equal to that of 11·37 sperm candles, or 12·99 wax; and, at Finsbury Square, it was equal to 11·38 sperm, or 13·00 wax. The gas was burnt at the rate of 5 cubic feet per hour, and the candles were reduced to the standard consumption of 120 grains per hour. These results are satisfactory, for they show that the power of the gas has been about 9 per cent. above the requirements of the Great Central Act of Parliament. Dr. Letheby drew attention to the fact that the illuminating power of the gas had not suffered by the passage of the gas along a main of nearly two miles in length. This indicates a good and permanent quality of gas, such as should at all times be supplied to the public. The Great Central Company have relied upon this, and have not hesitated to extend their main from the city boundary to Finsbury Square, in order that the gas may be tested as frequently as possible. The results of the testings during the last three months have justified the confidence which they had in the illuminating power of the gas, and they have established the fact that the position of the testing-place is not a matter for consideration, excepting in those cases where the gas is of inferior quality, and will not bear a journey of more than 1000 yards from the works. He also stated that the pressure of the gas had been uniformly very good, for it had rarely been below an inch of water. Even at Finsbury Square, which is at the extreme end of the main, it ranged in most cases between an inch and a half and an inch and a quarter of water. The chemical quality of the gas had also been good, as regards the complete absence of sulphuretted hydrogen and the presence of but few traces of ammonia.

DR. J. NORTHCOTE VINEN'S FORTNIGHTLY REPORT ON THE GAS SUPPLIED BY THE SURREY CONSUMERS COMPANY.—

Week ending. 1861.	Number of Observations.	Maximum Light. Candles.	Minimum Light. Candles.	Average Light. Candles.
June 8	4	16·02	13·95	15·33
„ 15	4	18·55	14·04	16·72

The volume of hydrocarbons averaged 4 per cent.; carbonic acid, ·75 per cent.; sulphuretted hydrogen, none. Ammonia was present on June 4, 7, 10, and 14. The maximum pressure was 2 inches 3/10ths; the minimum, 2/10ths. The ordinary working pressure averaged 6/10ths of an inch.

EXPLOSION AT AN AMERICAN OIL-WELL.—An accident, of a fatal and most alarming character, occurred lately, at a new well on the Buchanan Farm, a few miles up Oil Creek from its junction with the Alleghany, in Venango County, Pennsylvania, by which sixteen men lost their lives, and many more were injured—some, no doubt, fatally. Numerous accidents of a similar kind have happened, but have seldom been attended with fatal results. Considerable variation in the quality of the oil exists, as found in different localities, showing a range of from 16° to 20° of specific gravity, as exhibited by Baumé's hydrometer. The lighter grades of oil are highly inflammable and volatile. The vapours rise from the mass, and, when they are relieved from pressure, they ignite at considerable distance from the surface of the oil-well. In most cases, when oil of this character is struck, large quantities of carburetted hydrogen gas rush from the aperture opened by the drills. When this is incorporated in due proportions with the atmosphere (one volume of gas with from four to seven volumes of air), it becomes as explosive as gunpowder, and more easily ignites. In this case, a fountain of oil and gas was struck or opened, and, as usual in some sections of the oil regions, there was a violent rushing and spouting out of oil, which was represented by the witnesses as rising 50 feet in the air, and flying in spray in all directions. There is always much excitement on such occasions, and the people in the locality rush to see the wonder, which, in most cases, is a scene for rejoicing and congratulation. The fires at the nearest engines in the vicinity were quickly extinguished by water, and some 35 to 40 men had gathered around this new oil-fountain, when, as if by an electric stroke, an explosion took place, which was heard and felt six miles distant. This atmosphere became an element of fire, and all within its influence were destroyed or terribly injured. Several persons were instantly killed; others inhaled the fire, and felt the terrible gnawings of internal fire as well as the external roasting of the flesh; and yet they lived some hours in this anguish, begging their friends to put them out of their misery. The fire thus kindled was said by some to have been caused by a lighted cigar in the mouth of one of the proprietors, who was also a victim of the explosion; others think it was ignited from an engine 100 feet from the well. Science and experience have frequently given warnings, and now a most terrific lesson speaks to those engaged in enterprises of this kind, that surely will be heeded for the future. For two days the fire raged unrestrained—flashing and leaping, at times, to 100 feet or more. Several derricks and fixtures in wells in the neighbourhood, and many hundreds of barrels (some say thousands) of oil, were destroyed.

CONVICTION FOR ILLEGALLY OBTAINING GAS.—At the Bolton Borough Court, on the 8th inst., the magistrates had brought before them a most important case under the "Gas-Works Clauses Acts, 1847," section 18, which declares, "that every person who shall lay, or cause to be laid, any pipe, to communicate with any pipe belonging to the undertakers," meaning gas companies, "without their consent, shall be liable to a penalty of £5, and to forfeit a sum of 40s. for every day the said pipe shall so remain." The facts of the case, as elicited by Mr. Hall, who appeared for the prosecution on behalf of the gas company, were concise and simple:—George Taylor, the company's meter inspector, was engaged on Monday in Great Moor Street, at his ordinary duties, and called, as was his usual custom, at the place of business of William Lever, tinplate-worker, who resides at No. 40, and has his shop underneath the house. The inspector notified in the house that he was about his business, and then went into the cellar to examine the meter, when he found an indiarubber tube attached, in such a manner as almost to defy detection, to the main-cock, and then connected with the inside gas-fittings; the consequence being that a supply of gas was obtained without being registered. In defence, Mr. Richardson appeared, and not denying the facts, pleaded for a mitigation of the penalty on the ground, as he was instructed, that the defendant was not aware of what had taken place, but that his lad had been larking with the meter. The Magistrates inflicted a penalty of £5 and costs, which the defendant paid.

THE GAS SUPPLY OF BRIGHTON.—At the last meeting of the town council, the lighting committee reported that they had had an interview with Mr. J. B. Paddon, superintendent to the Brighton and Hove General Gas Company, respecting the supply of gas to the public lamps. Mr. Alderman Sawyer said that he believed Mr. Paddon's principal reason for coming to them arose from the remarks that had been made relative to the supply of gas to the public lamps. He said he had the means of proving that the supply was a great deal more than the specified quantity. Mr. Brigden said he did not know what Mr. Paddon might have told the committee, but he (Mr. B.) had full confidence that the works committee would not allow themselves to be cajoled. One fact was worth 999 arguments, and there was one public body in the town being supplied at 25 per cent. less than the town was. Mr. B. then referred to the towns to the east and west of Brighton where reduction had been made, and asked why a reduction had not been made in Brighton? He believed that, in less than fifty years, gas would be 2s. 6d. per 1000, and that every municipal town would have its own gas-works. They were now putting on new gas-burners, and new regulators, and were numbering all the lamps, but he did not know by whose authority! In some of the outskirts of the town, the supply was "small by degrees, and beautifully less." As to saying they burnt 5 feet an hour, it was preposterous. Mr. Alderman Smithers said Mr. Brigden had implied that the railway company paid 25 per cent. less than the town did, but that was not so—the railway company paid 4s. per 1000 for gas laid into the entrance of their premises, and Mr. Paddon proved that the town was paying only 3s. 3d. Each lamp consumed 5 cubic feet per hour, the consumption for the year, from sunrise to sunset, thus being 21,635 feet per lamp; and, after deducting 10s. as the cost of lighting, cleaning, and extinguishing each lamp, they would find that not a single company in London supplied the lamps at so low a rate. No London company supplied the lamps under £5 each, and it appeared that in Brighton they were only paying £4. In one district in London, £6. 5s. per lamp, per year, was charged. The Mayor said there were 4327 hours in a year during which the lamps were alight, which at 5 feet per hour amounted to 21,635 feet, and, after deducting 10s. for lighting, the cost of consumption at each lamp amounted only to £3. 10s. If they were paying too much, let them do justice to the town, and pay less; but if not, let them give up the controversy in justice to the gas companies. Several other councillors spoke on the subject, and the proceedings of the committee were confirmed.

Advertisements.

WALCOTT'S NEW PATENT RETORT.

ONE-THIRD saved of Furnace Fuel commonly used. A Six or other sized Bed of Retorts can be changed at once into a Three or Two-Bed, &c., when working or down. "*Furnace fed with two currents of* HEATED *air to intensify combustion.*"

The Fire playing on the back and two side walls, also covering arch in common settings, is permeating on larger-sized retorts. An effectual method devised for destroying the incrustation of Carbon inside Retorts. The patent Retorts and Furnaces are more easily repaired than the common settings.

Prices, Plans, &c., from Mr. GEO. WALCOTT, Gas Engineer, 24, Abchurch Lane, LONDON.

Moneyed Partner wished for Working Patent.

SHARES IN THE EQUITABLE GASLIGHT COMPANY.

MESSRS. DRIVER have received instructions from the Board of Directors of this company to offer for SALE by Auction at the Mart, on Wednesday, June 26, in Fifty-nine Lots, 437 UNAPPROPRIATED SHARES, of £25 each, in the Equitable Gaslight Company, on which one call of £5 is payable. This Company, incorporated by Act of Parliament in 1842, is now paying a dividend of 10 per cent. These shares for sale constitute the residue of a new issue of 4000 shares, the whole of which, except the 437 now for sale, have been taken up by existing shareholders; the present opportunity is, therefore, a favourable one for the investment of capital.

Printed particulars may be obtained at the Auction Mart; at the Offices of the Company, 21, John Street, Adelphi; of Messrs. J. and C. ROGERS, Solicitors to the Company, Manchester Buildings, Westminster; and of Messrs. DRIVER, surveyors, land agents, and auctioneers, 5, WHITEHALL, S.W.

LESLIE'S PATENTS: Gas and Coke from common Coal, greatly increased in value.—60, Conduit Street, LONDON, W.

LESLIE'S PATENTS: Up to Forty Candle Gas.—60, Conduit Street, LONDON, W.

LESLIE'S PATENTS: Licenses for England, Scotland, and Ireland, the 86 Departments of France and Belgium.—60, Conduit Street, LONDON, W.

LESLIE'S PATENTS: The National Waste Heaps at Collieries UTILIZED for Gas purposes.—60, Conduit Street, LONDON, W.

CLAY Purification of Gas, whereby a total removal of AMMONIA is effected, may now be carried out by all Gas Companies, and made a SOURCE OF CONSIDERABLE PROFIT. Any Gas Company wishing to adopt the process, can have full particulars as to use of patent, &c., on application to ALEX. SIMPSON, Steam Mills, Snow Hill, BIRMINGHAM.

SAMUEL CUTLER, Gasholder MAKER and CONTRACTOR

For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.

PROVIDENCE IRON WORKS,
MILL WALL, POPLAR, LONDON, E.
Main Laying and Gas-Works erected complete.

BELGIAN CLAY RETORTS.

ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Albert Keller, of Ghent, begs to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by him. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications, addressed to ALBERT KELLER GHENT, will receive immediate attention.

TO BE SOLD, a Second-hand GASHOLDER, in good condition, 40 ft. by 12 ft. Counterbalanced at three points with 6-inch Inlet and Outlet-Pipes and Valves complete.

For price and further particulars, apply to Mr. HUNTER JONES, Gas-Works, NORTHAMPTON.

ESTABLISHED 17 YEARS.

OFFICE for the Procuration of LETTERS PATENT, and the REGISTRATION of DESIGNS. JOSEPH WILLCOCK and Co., Patent Agents and Engineers, Successors to Messrs. Barlow and Co., 89, Chancery Lane, LONDON, W.C.

GRATIS, and post free, "THE INVENTOR'S MANUAL;" also a pamphlet, "*L'Obtention de Patentes Anglaises;*" 500 MECHANICAL MOVEMENTS; the first part of Kinematics, or the Transformation of Motion. By JOSEPH WILLCOCK, C.E., Mem. Soc. of Eng. May be had at the above address, and of any Bookseller. Price 2s. 6d. The second part is approaching completion, and will shortly be announced.

500
HOLMAN'S PATENT DOUBLE-ACTION PUMPS

Prove their general adaptation. They are adopted by

CIVIL, MARINE, MANUFACTURING, AND MECHANICAL ENGINEERS.

For Pumping TAR, AMMONIACAL LIQUOR, WATER, WORT, and other fluids, their intrinsic excellence is too well known to need description.

S. HOLMAN tenders his hearty thanks to all Patrons, and is prepared to undertake the Supply of Towns, Public and Private Establishments, and Irrigation of Lands, on any scale.

Sole London Agent of the Williams's Perran Foundry Company, for the Sale of Cornish Pumping, Winding, and other Steam-Engines, heavy Machinery, Castings, and Forgings.

London Agent for Tangye's Patent Hydraulic Presses, Jacks, Lifts, Crabs, Cranes, Blocks, &c

ALL KINDS OF HYDRAULIC AND STEAM MACHINERY FOR HOME USE OR EXPORT.

Cornish Boilers of superior construction, Steam-Cocks, Gauges, and Fittings.

S. HOLMAN, C.H.E., 18, CANNON STREET, E.C.

EDWIN DIXON,

WOLVERHAMPTON PATENT WROUGHT-IRON TUBE WORKS,

Originally established in 1833,

Manufacturer of Gas and other Tubes, Fittings, and articles of every description belonging to Gas, Water, or Steam.

E. D. had the honour of receiving the

PRIZE MEDAL

warded to this Manufacture by the COUNCIL of the GREAT ENGLISH EXHIBITION of 1851; and from he latter date has supplied many towns exclusively with GALVANIZED and other Tubes for Gas and Water, under GOVERNMENT ENGINEERS.

A City, containing 150,000 inhabitants,

has recently been entirely supplied with Tubes made at the above-named Works, and several others with populations nearly as great; in fact, the reputation now acquired induces this notice to the public.

Large Stocks generally on hand, averaging from one to three hundred thousand feet.

HYDRAULIC PRESS TUBES,

to resist 6000 lbs. and upwards to the square inch, extensively manufactured.

STOCK DIES and SCREWING TACKLE

of the best possible descripton.

Every Tube carefully tested with Hydraulic Pressure before leaving the Works.

WANTED, a person acquainted with Oil-Gas Apparatus.

Apply, post paid, to J. P., office of JOURNAL OF GAS LIGHTING, 11, Bolt Court, Fleet Street, LONDON, E.C.

A YOUNG MAN, having had practical experience on Works, is anxious to obtain an engagement as DEPUTY-SUPERINTENDENT of Provincial Gas-Works. He would not object to assist as Inspector, in addition to his duties on the works. Unexceptionable references.

Address, C. H., care of Mr. JONES, 171, Fenchurch Street, LONDON, E.C.

RETORT MOUTHPIECES.

TO BE SOLD, very cheap, Fourteen ROUND RETORT MOUTHPIECES, 15 in. diameter, with Sockets for 4-inch Stand-pipes. Complete with Ears, Lugs, and 28 cast-iron Lids.

For price, &c., apply to Mr. J. L. COCKER, Gas-Works, MERTHYR TYDFIL.

TO GAS COMPANIES AND OTHERS.

WANTED, a Tank and Gasholder complete, of about 50 feet by 20.

Full particulars to be forwarded to ALEXANDER STARK, Engineer, Consumers Gas Company, WOOLWICH, or to J. A. CROOKENDEN, Secretary.

Woolwich, June 14, 1861.

BAHIA GAS COMPANY (LIMITED).

3, Cloak Lane, Cannon Street, E.C.

The FIRST GENERAL MEETING of this Company will be held THIS DAY (June 18th), at their Offices at the above address. The chair will be taken at half-past Two precisely.

The Transfer Books of the Company will be closed from Wednesday, the 5th, to Tuesday, the 18th of June, both days inclusive,

By Order of the Board,

June 4, 1861. ARTHUR CLARKE, Secretary.

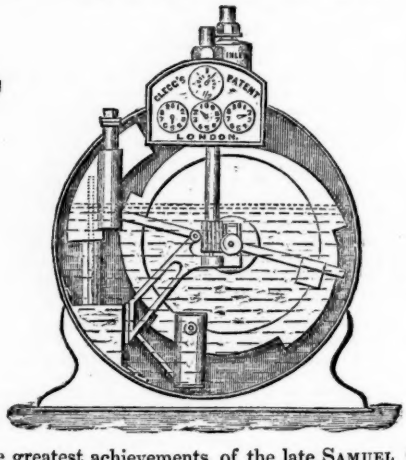
CLEGG'S
NEW PATENT HYDRAULIC GAS-METER.

BISCHOFF, BROWN, & CO.,

MANUFACTURERS

AND

SOLE LICENSEES,



LANGHAM WORKS,

GEORGE STREET,

GREAT PORTLAND STREET,

LONDON, W.

This Meter is the last and one of the greatest achievements of the late SAMUEL CLEGG, C.E., in his connexion with the Manufacture and use of Gas, and, without presumption, it may be confidently affirmed to be the only Meter extant that can be relied upon to measure correctly, to work with the minimum of pressure, and steadiness of light. It cannot be tampered with by tilting or otherwise, and will be of great durability.

This Meter is constructed on an entirely new principle, and, when once adjusted, will always remain the same under all circumstances. The quantity or height of the water in it has no effect on its *capacity*. The immense importance and economy of this to Gas Companies who are obliged to employ so many inspectors, doing their utmost to prevent tampering with the Meters, is so obvious, that they will be able to appreciate its advantages over all other Wet Meters, where the varying height of the water regulates the capacity, and is, in consequence, a perpetual source of annoyance, bad feeling, and litigation, between the Gas Companies and consumers.

The following experiments clearly point out our advantages, and can be readily tested :—

Old Water Meter.

2 pints above the line	.. 5 lights	.. 13½	per cent. fast.
1 „ „	.. 5 „	.. 7⅓	„ „
Water on the line	.. 5 „	.. ⅛	„ „
1 pint below the line	.. 5 „	.. 5	„ slow.
1½ „ „	.. 5 „	.. 7½	„ „
1¾ „ „	.. 5 „	.. 10	„ „

A fluctuation of 23½ per cent.

Clegg's New Patent Hydraulic Gas-Meter.

Water on the line	1 inch pressure	5 lights	½ per cent. slow.
1 pint below	1 „ „	5 „	½ „ „
2 „ „	1 „ „	5 „	½ „ „
2 „ „	1½ „ „	5 „	right
2 „ „	½ „ „	5 „	„

A fluctuation of ½ per cent.

The Drum, from its peculiar construction, presents scarcely any resistance when moving through the water; and, its weight being taken off its axis by an air vessel, it revolves with the slightest pressure.

The comparative absence of friction in the Drum reduces the wear and tear, and enables it to be made of the strongest materials, which will keep it in working order longer than any other Meter.

It is approved and adopted by the principal London and Country Gas Companies, and is guaranteed to comply with the "Sale of Gas Act," as this Meter, beyond all doubt, works within a shorter range of registration than any other Meter manufactured.

GAS PURIFYING BY REVIVIFIABLE OXIDE OF MANGANESE.

MR. LAMING (Inventor of the Revivified Oxide of Iron Purification) begs to inform Gas Engineers that they may now supersede the material in general use by A REVIVIFIABLE OXIDE OF MANGANESE of his preparing, which in efficacy is at least equal, and in economy superior, to Oxide of Iron. Owing to the greater chemical activity of Manganese, common dry-lime purifiers of ordinary capacity will often be amply sufficient for it, though they may be too small for the Oxide of Iron material.

For Gas-Works possessing steam power, more especially such as are exposed to public complaint, Mr. Laming recommends the purification to be done either wholly or in part (depending on extent of apparatus) in out-of-doors scrubbers, hermetically sealed, by means of his liquid process, which is both economical, and meets all practical requirements.

118, Fenchurch Street, Aug. 1, 1859.

ON COAL GAS,

BY

THE REV. W. R. BOWDITCH.

Post 8vo., Cloth 2s. 6d.

JOHN VAN VOORST, 1, PATERNOSTER ROW.

Now Publishing, in Bi-Monthly Numbers, Subscription 18s. per annum,

THE AMERICAN GASLIGHT JOURNAL.

The Official Gazette of Light, Heat, Water Supply, and Sewerage.

LONDON: TRÜBNER AND CO., 60, PATERNOSTER ROW.

GEORGE BOWER,

GAS ENGINEER, MANUFACTURER, AND CONTRACTOR,

ST. NEOT'S, HUNTS.

References to between 100 and 200 Gas-Works Designed and Erected by the Advertiser.

CAUTION.

TO GAS-METER MANUFACTURERS AND OTHERS.

THE Undersigned hereby caution Meter Manufacturers and others against infringing the exclusive right of the Undersigned to the use of the Screw Adjustment for regulating the Height of the Overflow-Pipes in Wet Gas-Meters, as described in the Specification of the Letters Patent granted to Crosley and Goldsmith on the 19th of April, 1856; as well as against infringing any other portions of that or any other Patent of the said William Crosley; and

NOTICE is further given, that all Infringers of the said Inventions, or any portions of them, will be proceeded against.

CROSLEY & CO.,
103, SOUTHWARK BRIDGE ROAD,
LONDON, Aug. 29, 1859.

WILLIAM RICHARDSON

(LATE OF DUDLEY),

CONSULTING ENGINEER,

PATENTEE OF THE VERTICAL OVEN RETORT

No. 367, PERSHORE ROAD,

BIRMINGHAM.

COLN RIVER WATER-WORKS COMPANY.

Incorporated by Act 22 and 23 Victoria, Session 1860.

CAPITAL, £60,000, IN 6000 SHARES OF £10 EACH.

This Company has been incorporated, by Act of Parliament, to afford a supply of pure water, from the River Coln, to the large and increasing population located in the western and north-western districts of London, including, amongst others, the following Towns and Places—viz., Harrow, Ealing, Hanwell, Heston, Spring Grove, Isleworth, Hounslow, and Staines.

A large number of the shares have already been taken.

Application for the remainder to be made to the secretary, CHARLES ELEY, Esq., at the Company's Offices, 27, Great George Street, WESTMINSTER, where prospectuses and further particulars may be obtained.

JAMES FERGUSON and CO., Lessees of the Auchinheath and Craignethan Gas Coalfields (the most extensive and valuable in the parish of Lesmahago), respectfully intimate to the Managers of Gas-Works and Consumers of Gas Coal, that they are prepared to ship the best quality of the above well-known COALS at Glasgow or Leith; and also to deliver them at the railway stations upon, or connected with, the Caledonian Railway, to any extent which may be required.

Price, free on board, or delivered at the railway stations, may be learned by addressing James Ferguson and Co., Gas-Coal Works, Lesmahago.

Shipping Agent for Glasgow:
MR. ALEXANDER STRATTON,
159, WEST GEORGE STREET.

LEONI'S Patent Adamas Gas-BURNERS (secured by Her Majesty's Royal Letters Patent), are entirely free from liability to CORROSION, injury from Heat, or danger of Fracture, and are UNALTERABLE in the dimensions of their Apertures.

Uniformity in the consumption of Gas is obtained by the process of manufacture, which ensures that the Burners shall be of precisely similar pattern.

The Adamas Burners are confidently recommended to Gas-Fitters, Consumers, and Companies.

Sole Manufacturer and Patentee in Great Britain, S. LEONI, Adamas Works, St. Paul Street, New North Road, LONDON, N.

WHITEHOUSE and CO., Boiler and GASHOLDER MAKERS,

GLOBE PATENT TUBE WORKS, WEDNESBURY,

Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.

Orders promptly executed.

TO Mr. BENJAMIN WHITEHOUSE,

GASHOLDER MAKER,

WESTBROMWICH, NEAR BIRMINGHAM.

Sir,—I feel great pleasure in expressing my satisfaction at the manner in which you discharged your duties as CONTRACTOR for the TELESCOPIC GASHOLDER, 150 feet diameter and 60 feet deep, erected at this Company's Nine Elm Station in 1857. From that period to the present I have closely watched its working, and have never found the least defect either in workmanship or material.

During the recent heavy gales the Gasholder, although containing upwards of 1,000,000 cubic feet of Gas, showed no perceptible indications of its influence, but worked as freely and easily as usual.

RICHARD JONES.
Engineer to the London Gaslight Company.
Vauxhall, London, Nov. 9, 1859.

WILLIAM BLEWS AND SONS'

IMPROVED MACHINE-MADE BURNERS

WROUGHT-IRON BATSWINGS,

FOR RAILWAY STATIONS AND MARKETS,

GAS-FITTINGS, CHANDELIERS,

BRASS AND IRON TUBES OF EVERY KIND

SUPPLIED ON THE BEST TERMS,

AT THE WORKS,

9, 10, 11, BARTHOLOMEW STREET,

BIRMINGHAM.

WILLIAM STEPHENSON & SONS,

THROCKLEY,

NEWCASTLE-ON-TYNE,

MANUFACTURERS OF EVERY DESCRIPTION OF

FIRE BRICKS, CLAY RETORTS, LUMPS, TILES,

&c. &c.

LONDON OFFICES:

76, KING WILLIAM STREET, CITY.

A large stock of Fire-Clay Goods always on hand in London, at the lowest wharf prices, at Messrs CHRISTIE & Co.'s Wharf, 64, Bankside, SOUTHWARK.

THOMAS EDGE,

MANUFACTURER OF PATENT WET AND DRY GAS-METERS,

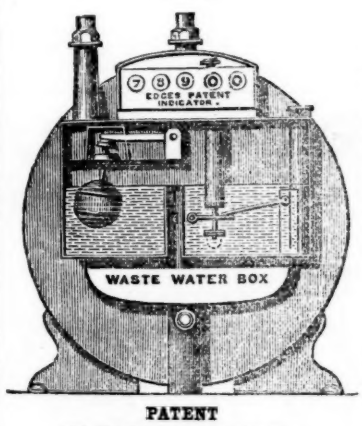
AND GENERAL GAS APPARATUS AND FITTING WORKS,

59, GREAT PETER STREET, WESTMINSTER, LONDON.

Station Meters, Experimental Meters, and Gasholders; Governors, Pressure Registers, By-pass and Slide-Valves, Photometers, &c.

Emyortant Notice.

No. 1.



PATENT LEVER-VALVE WET METER

Engraving No. 1.

THOMAS EDGE'S Lever-Valve Meter, with Water-Box, to preserve the proper water-level (or measuring-chamber), has now, by the Sale of Gas Act, become the standard Water-Meter for universal use in the United Kingdom. With the addition, in proof of the exclusive advantage of his Meters, that all the common Meters now in use by all Gas Companies, are, by the same Act, condemned to be taken down, and altered to the same principle of regulating the Water-Line. Thousands of these improved Meters have been already manufactured by Mr. Edge.

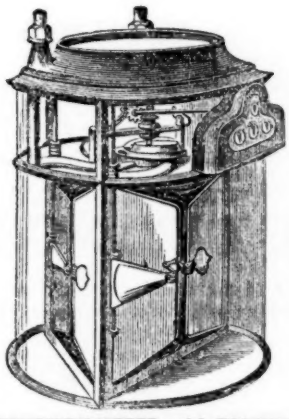
*** The Prussian Government have passed a Law, requiring the same description of Water-Meter to be used throughout that kingdom.

Engraving No. 2.

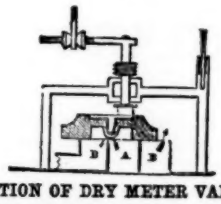
THOMAS EDGE, having patented the first Dry Meter ever invented in this country, has, of late years, discovered the serious defects of the imperfect slide-valve used in all other Dry Meters, which soon allows the gas to pass without being registered by the index; he has, therefore, substituted the very beautiful, action of the Eccentric Rotary Valve, which, by the peculiarity of its movement, has a constant tendency to wipe its surface clean and bright—thereby preventing the possibility of any gas passing without being registered by the index.

This Improved Dry Meter, in addition to its other advantages, can be fixed in warm Kitchens, Sitting-Rooms, or even Bedrooms, it being equally adapted to warmth or to the most intense cold—they having for several years been in constant use in Norway, Sweden, Denmark, &c., &c.

No. 2.



PATENT DRY METER, with ECCENTRIC ROTARY VALVE.



SECTION OF DRY METER VALVE.

GAS-WORKS ERECTED FOR LIGHTING TOWNS, MANUFACTORIES, NOBLEMEN'S & GENTLEMEN'S MANSIONS, ETC.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

HARRIS and PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.
MANUFACTURERS OF
FIRE BRICKS, GAS RETORTS, &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King.
Originally J. Pidcock, Esq.
NB. A quantity of best Clay Retorts in stock, viz.—
Circulars, 14 inches, 15 inches. 16 inches.
D's, 16×12, 15×14, 20×16, 16×18.

JAMES NEWTON,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANT,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON.
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and CLAY,
and every Article suitable for
GAS AND WATER WORKS.

GEORGE CUTLER & CO.,
GAS ENGINEERS, &c.,
London Gasholder and Boiler Works,
8, WHARF, WENLOCK ROAD, CITY ROAD, N.,
LONDON.

Rye, Nov. 12, 1860.
Dear Sirs,—I consider it incumbent on me to acquaint you that the alterations recently made on the Rye Gas-Works—viz., the addition of a NEWLY-IMPROVED WASHER, and other work for the Purification of Gas, executed by the experienced workmen under your able supervision—are perfectly satisfactory to the Company, and the Gas is now as pure as it can be made.
I am, dear Sirs, your obedient servant,
CHARLES THOMAS, Superintendent,
Rye Gas-Works.
Messrs. Cutler and Co.

Now ready,
VOL. IX. of the JOURNAL of GAS LIGHTING, WATER SUPPLY, and SANITARY IMPROVEMENT, for 1860, price 21s., bound in cloth and lettered. A few copies of Vols. II., III., IV., V., VI., VII., and VIII. are still on sale.
W. B. KING, 11, Bolt Court, Fleet Street.

Just Published, price 3s., by Post, 3s. 2d.,
THE CHEMISTRY OF GAS LIGHTING,
with an Appendix containing a description of the different processes for the Manufacture of Colouring Matters from Coal Tar.
Re-arranged and reprinted from the JOURNAL OF GAS LIGHTING.
LONDON: WILLIAM B. KING, 11, BOLT COURT, FLEET STREET, E.C.

F. SIMMONDS and SON,
RETORT AND BOILER-SETTERS,
AND CONTRACTORS FOR GAS-WORKS IN GENERAL, FOR MATERIALS AND LABOUR, OR LABOUR ONLY.
OFFICE:
2, YORK PLACE, KINGSLAND ROAD, N.E.
Contractors at the Chartered Gas-Works, Curtain Road, and numerous Provincial Gas-Works.

WALTER MABON, Engineer,
ARDWICK IRON WORKS, FAIRFIELD STREET
MANCHESTER,
Manufacturer of
IRON TANKS for Gasholders, Railway Stations, &c.
GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.
GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.
WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.
IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.
PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

W. C. HOLMES & CO.,
GAS ENGINEERS,
WHITESTONE IRON WORKS, HUDDERSFIELD.
Manufacturers of Gas Apparatus, Gasholders, Iron Tanks, Roofs, &c. &c.
Contractors for the Erection of Gas-Works throughout of any magnitude.
Plans, Specifications, and Estimates prepared.
Makers of the Combined, Condensing, and Purifying Apparatus (especially adapted for exportation), uniting simplicity and compactness with great efficiency and facility of working.
References given to Works where it is in operation.

WEST and GREGSON, Gas-Meter
MANUFACTURERS, &c.
UNION STREET, OLDHAM.
Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.
W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

STOURBRIDGE FIRE-CLAY WORKS.
E. BAKER and CO.
(Contractors to Government).
24 WHARF, HARROW ROAD, PADDINGTON, W.
Every article manufactured at their own Works and Mines, Brierley Hill.
FIRE-BRICKS, Lumps, Squares, Tiles, and Gas Retorts of all dimensions.
CRUCIBLE and CEMENT CLAYS.
GARDEN EDGINGS, of various patterns.
BUFF and ORNAMENTAL TILES.
CLINKERS and STABLE PAVINGS, noted for hardness and durability, being perfectly non-absorbent.
Shipments on the shortest notice.

R. LAIDLAW & SON,
GAS ENGINEERS, IRON & BRASS FOUNDERS,
Alliance Foundry, 147, East Milton Street, and Barrowfield Iron-Works,
GLASGOW;
AND AT SIMON SQUARE, EDINBURGH;
MANUFACTURERS OF
STATION & CONSUMERS METERS, ALL SIZES;
WROUGHT-IRON TUBES, FOR GAS, WATER, & STEAM; CAST-IRON RETORTS & PIPES;
HYDRAULIC MAINS, CONDENSERS, WASHERS, SCRUBBERS, PURIFIERS, & TANKS.
GASHOLDERS;
GOVERNORS, SLIDE-VALVES, &c.;
WROUGHT & CAST IRON ROOFS & HOUSES.
Contractors for Gas-Works of any Magnitude. *Plans, Specifications, and Estimates furnished.*

FIRE-CLAY GAS RETORTS,
Made of the most refractory Clay in the world, possessing extraordinary properties of contraction and expansion without cracking; having a true form, and perfect internal smoothness.

GLAZED SEWERAGE & WATER-PIPES,
Made up to five feet diameter. Vitrified Pipes, for conveying Water under pressure, made, laid, and guaranteed to stand a required pressure for six months. Every description of sanitary goods.

FIRE-BRICKS, IRON, GLASS, & COPPER FURNACES.

A Pamphlet of Testimonials forwarded on application. Export Orders receive special attention for delivery, free on board, at Liverpool, Hull, or London. Manchester Dépôt, Mill Street, Great Ancoats; F. Tesseyman, Agent.

EDWARD BROOKE, Fieldhouse Fire-Clay Works, Huddersfield.

PERRENS & HARRISON,

THE LYE FIRE-CLAY AND BRICK-WORKS, STOURBRIDGE,

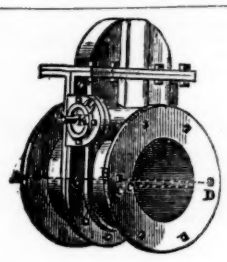
Successors to the late firm of J. and W. KING,

and Sole Proprietors of their well-known CLAY MINES, are prepared to supply

GAS-RETORTS, CLIFT'S PATENT GAS-OVENS and FIRE-BRICKS

OF ALL DESCRIPTIONS,

the superior quality of which will, they are confident, secure them further orders.



BRYAN DONKIN & CO.

keep always on stock their

IMPROVED GAS VALVES

from 2 inches to 18 inches, price 11s. 6d. to 13s. 6d. per inch diameter

List of prices, with full dimensions of all sizes up to 27 inches, to be had on application.

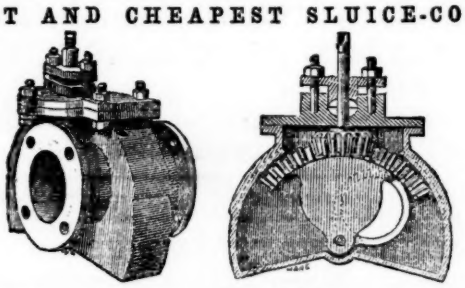
These Valves are all proved to 30 lbs. on the square inch before leaving the works.

BRYAN DONKIN & CO.,

ENGINEERS,

NEAR GRANGE ROAD, BERMONDSEY.

BEST AND CHEAPEST SLUICE-COCK.



BROWN AND MAY'S PATENT.

Above 3-inch diameter, price 10s. per inch. Brass face, 6d. extra inch extra.

Can be taken to pieces without being removed rom the line of Piping.

NORTH WILTS FOUNDRY, DEVIZES.

Wholesale Agents, Messrs. S. and E. RANSOME, 31, Essex Street, Strand, E.C., Where a Sample may be seen.

WALTER FORD,

LATE

PADDON and FORD,

GAS-METER AND APPARATUS WORKS,

GRAY'S INN ROAD, LONDON.

MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.

A large number of **STATION-METERS,** up to 80,000 feet per hour (being by far the largest in use), and **GOVERNORS** for **MAINS,** up to 24 inches, have been constructed by Paddon and Ford. These Meters and Governors possess peculiar advantages as regards strength and freedom of action.

Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

JOSEPH BOULTON,

28, BAGNIGGE WELLS ROAD, CLERKENWELL,

PATENTEE OF

DRY & IMPROVED WET GAS-METERS,

AND

GAS APPARATUS.

All Meters warranted to comply with the Act of Parliament.

F. & C. OSLER,

45, OXFORD STREET, LONDON;

Manufactory—Broad Street, Birmingham—Established 1807,

MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards

(Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of Gas in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

JAMES OAKES and CO.,

ALFRETON IRON WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast Iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, Lamp Columns of various patterns, &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

C. H. is prepared to carry out the warming and ventilation of public buildings, &c.; also civil engineering in general.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET,

DURHAM.

Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

JOHN ROGERSON and CO.,

NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.

Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

LONDON HOUSE:

12, ROYAL EXCHANGE BUILDINGS.

WROUGHT-IRON Guides for Gas-HOLDERS,

when Trussed upon scientific principles, are more capable of resisting strains, in every direction, than Cast Columns of any form can be; and weigh only one-fifth as much as the latter. Designs and Working Drawings for Guides and Ties can be obtained of the Inventor, CHARLES DIXON, C.E., Chichester, SUSSEX.

GAS COAL.

BEAL, WALKER, and CO., Coal and

COKE MERCHANTS, No. 1, Walker's Buildings, SHEFFIELD, beg to inform the Directors and Managers of Gas Companies, that they are in a position to contract for the supply of the different sorts of best Gas Coal, such as best Silkstone, Barnsley, and others, at the lowest prices, which may be had on application at the above Office.

ALFRED PENNY, Gas and

CONSULTING ENGINEER,

WENLOCK IRON WORKS,

21 & 22, WHARF ROAD, CITY ROAD, LONDON.

Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.

Plans, Specifications, and Estimates prepared.

Gas Stoves, Gas Baths, Gas Cooking

APPARATUS, warranted the best in England, at PHILLIPS's, the original inventor and manufacturer, and general gas-fitter, &c., 55, Skinner Street, Snow Hill, LONDON, E.C.

PATENT SAFETY ATLAS CHANDELIERS, Sun and Star Burners, Outside Lamps, Patent Reflecting Lamps, Portable Coppers for either Gas or Fuel. Iron Tube and Fittings. Best quality for Gas, Steam, or Hot Water, &c. &c.

GEORGE ANDERSON, Gas and

CONSULTING ENGINEER,

104, LEADENHALL STREET, LONDON (E.C.).

DIRECT-ACTING GAS-EXHAUSTERS,

supplied either with or without Steam-Engines and Boilers.

FOUR-WAY DIAPHRAGM VALVES,

one of which answers the purpose of THREE ordinary Valves, as applied to Purifiers, or in shutting off and passing Station-Meters, Governors, or other apparatus, while the Connecting-Pipes are also much simplified.

RETORT SETTINGS,

designed to be heated by Tar alone, and with a total absence of Smoke.

Illustrated circulars, giving references and every information, may be obtained on application as above.

BENJAMIN GIBBONS, Jun.,

DEEPDALE FIRE-CLAY & BRICK WORKS,

Near DUDLEY,

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

FIRE-CLAY RETORTS,

TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.

References given, if required.

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of
RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,
beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.
The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

TRUSS'S PATENT ELASTIC PIPE-JOINT,

FOR GAS AND WATER-MAINS, AND STEAM PIPING,

Is the only PERFECT joint that has ever been constructed, and supplies the long-felt desideratum, by allowing for the expansion and contraction of metals, and for oscillation and deflection, without impairing the joint. Gas Companies will effect an incalculable saving in adopting it, as compared with the present imperfect mode of jointing.

Drawings, Estimates, and every particular, furnished on application to

THOMAS SEAVILLE TRUSS, C.E., 53, GRACECHURCH STREET, LONDON, E.C.

EDWARD COCKEY AND SONS'

PATENT GAS VALVES.

These Valves are formed of two Cast-Iron Cylinders, with segmental divisions, having the faces ground gas-tight—the upper Cylinder turning horizontally on the lower one.

The lower Cylinder has pipes from each division, communicating with the vessels to and from which the gas is to be passed. The upper Cylinder has corresponding divisions, so arranged as to direct the passage of gas to the different segmental divisions in the lower part, and when it is turned on the face of the lower one, to alter the flow of gas from one vessel to another.

Each Valve has an index-plate provided, which is to be attached to the floor, and a pointer on the cover of the Valve shows which way it is turned. Thus, the Manager of the Works can at once see in which direction the gas is passing.

There are about fifty of these Valves now in use, of sizes varying from two to twelve inches, and they are giving great satisfaction. Amongst the Works at which they are fixed, the following may be mentioned:—

BASINGSTOKE.	CANTERBURY.	FROME.	RYDE.
BLANDFORD.	ENNISCORTHY.	GODALMING.	SANDWICH.
CHELTENHAM.	ELGIN.	NEWPORT.	WARMINSTER.

They are in course of erection at other important Works.

IRON WORKS, FROME SELWOOD.

EDWARD COCKEY AND SONS

ALSO MANUFACTURE

PURIFIERS, SCRUBBERS, CONDENSERS, AND OTHER IMPROVED GAS APPARATUS,

HAVING PATTERNS SUITABLE FOR GAS-WORKS OF DIFFERENT SIZES.

WILLIAM SUGG,

MANUFACTURER OF

PATENT DRY AND WATER GAS-METERS, TEST GASHOLDERS, AND APPARATUS,

"EVANS'S" PHOTOMETERS,

Experimental Meters, Minute Clocks, &c., Station Meters and Governors,

STREET-LAMP GOVERNORS AND LAVA BURNERS,

19 and 20, MARSHAM STREET, WESTMINSTER.

CROSLEY & GOLDSMITH'S

PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS

CANNOT BE OVER OR UNDERCHARGED WITH WATER,

and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variable.

MANUFACTURED BY

CROSLEY & CO.,

GAS-METER MANUFACTURERS,

103, SOUTHWARK BRIDGE ROAD, LONDON, S.E.

N.B. The Patent Self-Adjusting and Compensating Apparatus may be applied to the ordinary Meter.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENT METERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c., &c., similar to those used by Mr. King, of Liverpool.

CROSLEY & CO. are also prepared to supply Gas Companies and others with

DUPLICATES of Mr. KING'S CUBIC FOOT TRANSFERRER,

similar to that manufactured by them, and verified by the ASTRONOMER ROYAL, and PROFESSOR MILLER, of Cambridge, on behalf of the Government, which was deposited by C. & Co. in the Office of the COMPTROLLER-GENERAL of the EXCHEQUER before Nov. 13, 1859, in compliance with the "Act for Regulating Measures used in Sales of Gas." They also supply

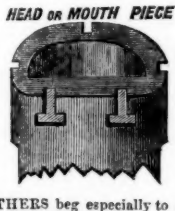
TEST GASHOLDERS,

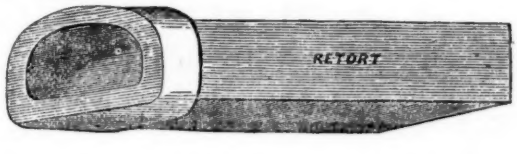
Graduated by the Standard Cubic Foot.

C. and Co. are the only house in the trade which has for years manufactured Meters according to the standard measure set forth in the 2nd Section of the "Sale of Gas Act," and which also comply with the rules laid down in the Section for testing meters. Purchasers of C. and Co.'s Meters may therefore be secured against any additional expenses being incurred in order to adapt their Meters to the requirements of the new Act.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.





KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge."

FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS, near LEEDS.

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

THE WORKS ARE WELL SITUATED

For EXPORT from the Ports of { LONDON, LIVERPOOL, HULL, MIDDLESBRO', HARTLEPOOL, and STOCKTON.

FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.

M B NEWTON, London Agent, No. 4, Wharf, King's Cross Goods Station.

SALE OF GAS ACT.

MESSRS. CROLL, RAIT, AND CO.,

Manufacturers of Croll's Patent Improved

DRY GAS-METER,

Also Manufacture and Supply

TEST GAS-HOLDERS,

And other Apparatus required by the Inspectors appointed in pursuance of the above Act.

Application for particulars to be made to the Factory,

CANAL BRIDGE, KINGSLAND ROAD, LONDON, N.E.

ALEXANDER WRIGHT,

55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.,

MANUFACTURER OF

CONSUMERS' COMPENSATING & NON-COMPENSATING WET GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

STATION-METERS & GOVERNORS,

WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, & REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

EXPERIMENTAL TESTING APPARATUS,

Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

"Analysis of Gas for Practical Men," by A. WRIGHT, M. Inst. C.E., post-free for 13 Stamps. PRICE-LISTS ON APPLICATION.

JAMES MEACOCK,

PATENT DRY AND WET GAS-METER MANUFACTURER,

7, SNOW HILL, AND 16, WEST STREET, LONDON.

ESTABLISHED 1836.

J. M. invites attention to his Improvements in EXPERIMENTAL WET GAS-METERS, by which he renders impossible any Leakage from the Stuffing-Box.

These METERS are GUARANTEED to meet all the Requirements of the SALE OF GAS ACT

GOVERNORS, STATION-METERS, PHOTOMETERS,

EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,

AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS OF

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT-IRON PIPE, BLACK & GALVANIZED. COPPER. TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER

for clearing out Mains, Services, and Interior Fittings—60s. net.

Boyle's Patent Silvered Glass Combination Reflectors and Outside Lanterns.

Sole Manufacturers of Church and Mann's Photometer.

Large Pattern Books, with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.

Printed by WILLIAM BOUGHTON KING (at the office of Joseph Clayton, 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, June 18, 1861.